August 2, 1943

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1982

Precision

IS THE CMP

WATCHWORD

Less of CMP precision cold rolled strip steel this way —

1. It is economically rolled to gauge non-ferrous metals for finished products.
2. It meets required physical characteristic requirements.
3. It consistently handles all right from fabrication.
4. It provides extreme accuracy in gauge.

A good one possible for your product? Don't overlook it — get the facts. You'll see many advantages in cold rolled strip steel when you investigate the versatile precision material.

STRIP STE

CMP

PRECISION COLD ROLLED

GIVES MAXIMUM PRODUCTION PER TON

The

COLD METAL PRODUCTS CO.

Subsidiary of the Cold Metal Process Co.

YOUNGSTOWN, OHIO

Compare—and You'll Pick Ampac!

It makes a big difference which a-c welder you pick today. See how much more new Allis-Chalmers Ampac "200" gives you in better, faster work!

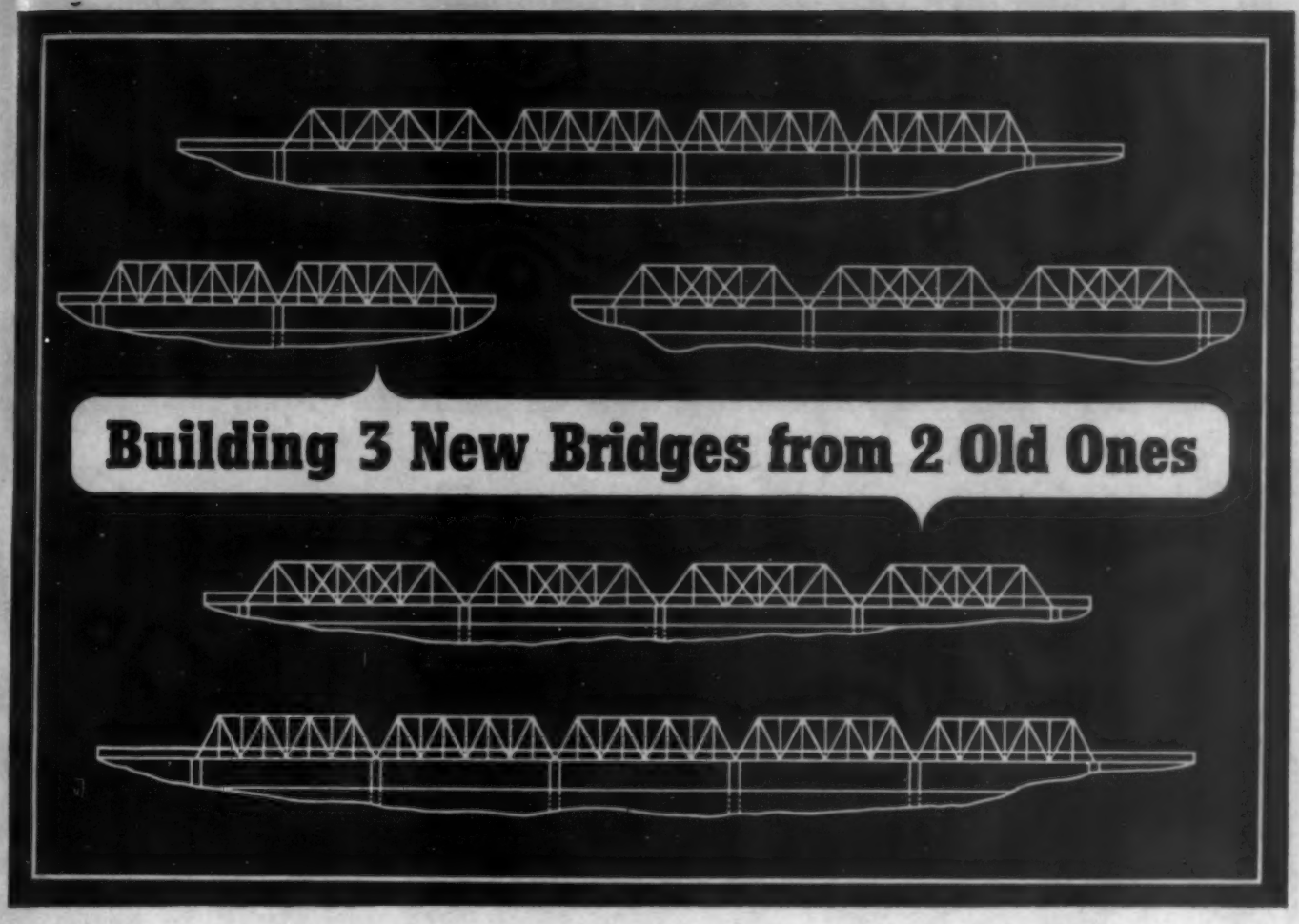
Compare 4 leading types of Transformer Welder in their Use of 11 Important Features . . .

IMPORTANT FEATURES	HOW THEY BENEFIT YOU	AMPAC "200" (Interlocked moving core type)	WELDER "B" (Moving coil type)	WELDER "C" (Moving core type)	WELDER "D" (Shunt type, moving core)
1 No arc blow to slow down welding.	Steady arc makes sound, uniform welds. You can weld in corners and grooves easily. Production is speeded.	YES	YES	YES	YES
2 Low striking voltage at high amperage.	Saves power for you. No need for high voltage at high currents. Raises power factor — cuts power input.	YES (65 volts)	NO (75 volts)	NO (75 volts)	NO (75 volts)
3 High striking voltage at low amperage.	Strikes arc fast. Gives you high, yet safe voltage necessary. Makes a-c welding easy at low currents.	YES (78 volts)	NO (72 volts)	NO (75 volts)	NO (75 volts)
4 Takes less than 300 sq. in. floor space.	Small size saves valuable space on crowded shop floors . . . makes it easier for you to move and handle the unit.	YES (281 sq. in.)	NO (361 sq. in.)	NO (308 sq. in.)	YES (288 sq. in.)
5 Contains less than 5 wearing parts.	Cuts maintenance to simple lubrication twice a year. Less chance for wear means longer service, lower upkeep.	YES (4 parts)	NO (8 or more)	NO (6 or more)	NO (8 or more)
6 Low original cost (no rotating element).	Simpler construction of a-c welder cuts purchase price to around 65% of what you would pay for a d-c welder!	YES	YES	YES	YES
7 Wide welding range of over 200 amperes.	You can weld thin sheets . . . yet have capacity for heavy plates, too. You can use rods from 1/16" to 1/4" in size!	YES (220 amp)	YES (215 amp)	NO (195 amp)	NO (195 amp)
8 Reconnectable for 220-440 & 208 v., 60 cycle.	Gives you full capacity at low voltages where lines are long and isolated. Can be used on *any* standard a-c voltage!	YES	NO (220 or 440)	NO (220-440 only)	NO (220-440 only)
9 Over 85% efficiency at normal loads.	You enjoy *full* benefits of a-c welding: lower power loss, high power factor, lower operating costs!	YES	NO	YES	YES
10 All settings within six control turns.	Saves welding time. Welder can make simple adjustment from high to low amperage current quickly and easily.	YES (6 turns)	NO (50 turns)	NO (30 turns)	NO (15 turns)
11 Movement of variable part 2" or less.	Cuts wear and maintenance to a minimum. Reduces hum and vibration Contributes to trouble-free operation.	YES (1 inch)	NO (9 inches)	NO (6 inches)	YES (2 inches)
	Only Ampac gives you all 11 . . . TOTALS	**11** Ampac "200"	**3** Welder "B"	**3** Welder "C"	**5** Welder "D"

ALLIS-CHALMERS AMPAC "200"

WRITE ALLIS-CHALMERS, MILWAUKEE, WIS., FOR COMPLETE INFORMATION

A1619



Building 3 New Bridges from 2 Old Ones

The Army needed quickly three steel railroad bridges to connect two parts of a Tennessee ordnance plant split by three channels of a wide, shallow river. Because new steel was not immediately available, the Army decided to build the bridges from parts of two very old, abandoned bridges.

Bethlehem's job consisted of taking down nine truss spans from the two old crossings, making alterations and rearrangements, and re-erecting the 1243 tons of old steel-work into the new bridges.

Many difficulties were met. The two crossings had a 45 deg. skew at each end which had to be eliminated. All of the truss spans were pin-connected. The removal of these pins, which were "frozen" fast with rust, was a problem. Falsework had to be built to support every panel point, as the members were removed and re-erected. Each member had to be marked so that it would be re-erected in precisely the same position in the new structure. Dismantling was complicated by transportation difficulties and proceeded slowly, because only one span could be taken apart at a time, using only two derricks. And 31,000 rivets had to be cut out and later redriven.

Despite these difficulties, Bethlehem crews, working nine hours a day, six days a week, completed the entire removal operation in three months. This is an average of only ten calendar days per span, including holidays. About the same number of man-hours was needed to erect the new bridge.

Made necessary by wartime conditions, the successful completion of this job is an example of the flexibility and versatility of Bethlehem's Fabricated Steel Construction Division. The organization that built these three new structures from two old bridges is the same organization that has constructed in record time hundreds of acres of tank factories, airplane plants, shipbuilding ways, and many other units of the arsenal of democracy.

★ ★ BETHLEHEM STEEL ★ ★

You can't make TOMORROW'S PRODUCTS *with*

YESTERDAY'S EQUIPMENT!

EVEN though postwar demands for all kinds of goods will be heavy, selling will still be competitive. People with money in the bank or in their pockets will still want the best they can buy for that money. Retailers and wholesalers must still have a profit margin. Manufacturers, therefore, will need to look at their costs more keenly than ever before.

To maintain our American standards of living, low machine-power costs must be balanced against higher man power rates. This means that the most modern machines, designed to turn out more and better work, must replace equipment that has worn out or been outmoded during the War period. Wherever possible, automatic operation must replace manual operation. New products and new materials will call for new tools. Many developments which have grown out of the war will be applied to postwar production. So, few manufacturers can say, with safety, that they can get along very well with their present mechanical equipment.

It is time now to start to study that equipment, with an eye to the future. Wise manufacturers are already fine-combing their plants, marking for sale or for scrap those machines which will no longer have a place in their postwar production. They are setting up reserves to permit the replacing of these machines by new, faster, better tools that are sure to be available, when war production pressure is off.

Monarch will be among those manufacturers which will have new developments to offer you, at that time. We have learned many lessons from wartime users of Monarch Lathes. These lessons are even now being assorted and studied, to determine how they can be used to improve Monarch Lathes, to help make more goods, for more people, at lower cost.

THE MONARCH MACHINE TOOL COMPANY · · · SIDNEY · OHIO

MONARCH LATHES

Save Time

BEHIND THE SCENES

Editorial Sermons

■ One of our good readers out in the midwest writes Earl Shaner that he frequently sends the page, "As The Editor Views The News", on to his preacher, who in turn has used several items for quotation in his sermons.

Our editor-in-chief got quite a kick out of that, as did we all. Not that his weekly analysis of the news couldn't well fit into a Sunday morning service, but rather that Earl just doesn't quite see himself in that light.

Pleasing Yet Distinctive

■ Someone was telling us the other day about the new nylon screening and how one drawback seemed to be rats could and would eat right through it. However, apparently they solved that by just putting some rat repellant right in the mixture. Reminds us of the rubber mattress manufacturers getting rid of the objectionable rubber smell by adding some nicely perfumed talcum powder to the basic material.

Even in the publishing business, you run into a similar problem, and as you've undoubtedly noticed yourself, some magazines aren't too pleasing to the olfactory sense. Of course, it's a combination of the printer's ink and paper used, but we'll lay a modest claim to being one of the best-smelling papers in the business. And it is natural.

Heart Tugs

■ Peter E. Rentschler, President, Hamilton Foundry & Machine Co., Hamilton, Ohio, sent us a little booklet the other day called, "A Father's Farewell to His Soldier Son", and we believe you'll like it well enough that you should write Mr. Rentschler and ask him for a copy. Particularly if a boy of yours is in, or about to go into, some branch of the armed forces.

Perpetual Motion

■ From Zionville, N. C., the other day came a penny postcard from J. E. Bissell, addressed to *Iron Trade Review* which, of course, was STEEL's name prior to 1930. But that isn't what has us so interested. The message on the card began—"TRUTH—Can you endure it?" and below is shown an "engineering" drawing of a flywheel and the copy begins by saying that here is a design for perpetual motion. It's all very intriguing except that right there the gelatin stencil that was used to run off the card apparently had a big hole in it and we can't for the life of us read the rest of the copy. But if anyone active on your company's postwar planning committee is interested in a really *new* product for after the war, we can't see what you'll lose by getting in touch with Mr. Bissell right away.

An Idea for Postwar Planners

■ The General Electric Co., of course, was one of the very first to get into postwar planning, beginning even before this country got into the war.

Now, along with their 184th dividend on common stock they have sent to all stockholders an interesting little questionnaire-booklet entitled "Electrical Living In Postwar America", and they ask that the return postcard be filled in with your answers.

There are thirty-five questions altogether, all well illustrated, and covering everything from whether you would prefer a refrigerator with revolving shelves instead of sliding shelves, to how much you know about the automatic blanket.

This approach isn't new. General Motors did it regularly for years to a wide cross section of car owners to determine what improvements and changes in design they could expect to incorporate successfully in their new models. It gave them information with which to plan models for several years ahead because they found that the public wouldn't stand too much of a change in any one year.

How many industrial firms selling machine tools, rivets, welding machines, alloy steels, small tools or roller bearings could apply this same technique to their planning for the future? Think it over in your own case and if you don't come up with an idea that will give you a better basis for postwar product planning, we'll be mighty surprised.

Two Different Things

■ Speaking of being surprised, we were by this letter last week from Anson G. Betts, West Cummington, Mass. No doubt you'll recall our lead story of July 19 entitled "Wanted—An Idea" in which we reported the appeal by the Lake Superior iron ore industry for a practical low-cost method for separating silica from iron oxide, in the great reserves of low-grade hematite in the Lake Superior District. Well, here's what Mr. Betts has to say about it.

I have had a lot of amusement out of your article about a Crazy Process wanted, for producing pig iron.

My experience indicates if anyone has an improved process for making iron, he would be told to go and see the chief of the Zulus about it.

When one reflects that iron is made in Europe out of 25% ore, and even in Birmingham out of 35%, one wonders how far the eminent Northern metallurgists have travelled.

While they can read "Steel" Shopese, can they read English, German, Russian and French?

And then, after a couple of more blasts, Mr. Betts closes with this classic line:

So you are starting a humorous magazine?

We have yet to catch any of our readers doubled up in howling glee from reading any of the business-like issues of STEEL recently, although there was a rumor running through the trade some time ago that a fellow out in Oshkosh cracked a very slight smile at one of our corny jokes a couple of years ago. For ourselves, we'll stick along with *Esquire* or *The New Yorker* for being really funny. Like, for instance, the cartoon they had in a couple of weeks ago showing the board of directors presenting a gold watch to the little office boy while the president says—*"Just a little token of our esteem and appreciation for your six weeks of loyal service."*

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Editorial Contents—Page 53

"Ramix-land" at War

In more than a hundred open hearths, steel is being made on Ramix bottoms. They represent better than 12% of the basic open hearth steel capacity of America.

Since the first rammed sub-hearth was installed in a southern 150-ton furnace in March, 1940, an average of three Ramix hearths have been put in every month. They range in size from small 20-ton jobs in steel foundries to the largest. More than a dozen are in 200-ton furnaces of ultra-modern design. They are located in every important steel producing center.

Not only does every Ramix hearth installed save several days of construction—making possible 10 to 15 additional heats of steel in the time saved, Ramix also makes a clean, slag-resistant bottom that requires a minimum of maintenance and repair. Delay time is reduced, furnace output per manhour is increased, steel poured is cleaner, and quality better.

Experienced Basic Engineers are at your service to supervise the installation of Ramix bottoms. Let us know when you have a hearth job to be done.

BASIC REFRACTORIES, INCORPORATED

CLEVELAND, OHIO

WITH THE LANDIS CHASER APPROXIMATELY 80% OF THE CHASER'S LENGTH IS *USABLE*

12 Features of the LANDIS TANGENTIAL CHASER

1–Permanent throat permits close to shoulder threading throughout life of chasers
2–Rake angle range covers all machinable materials
3–Free cutting condition permits maximum cutting speeds
4–Simple grinding operation renews entire cutting edge and leading feature
5–Line contact with work lessens friction and minimizes thread distortion
6–Leading feature insures thread of accurate lead
7–Lateral absorption of cutting strain reduces vibration and chaser breakage
8–Right and lefthand threading feature reduces chaser equipment
9–Standard chasers thread all diameters with proper chaser holders
10–Interchangeability of chasers lowers operating cost
11–Chaser length provides exceptionally long life and low tool cost
12–Permanent throat gives equal distribution of cut

CHASER LENGTH PROVIDES EXCEPTIONALLY LONG LIFE AND LOW TOOL COST

Since the design of the Landis Chaser makes it possible to regrind approximately 80% of its length, with the cutting edge renewed at each regrinding, it has an exceptionally long life and thereby reduces chaser cost to a minimum. Conservatively estimated, the life of the Landis Chaser is from ten to twenty times that of the hobbed type die.

The Finest Thread Cutting Tool in Industry

LANDIS MACHINE COMPANY

WAYNESBORO, PA., U.S.A.

THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS

Speeds Material Handling ...for Victory!

RE-POWER with READY-POWER

Gas-Electric Power Plant for Electric Truck Operation

R-P power for electric truck operation, handles materials at lowest cost per ton.

Baker Fork Truck

Yale Crane Truck

Hi-Lift Truck

Elwell-Parker Truck Steel Handling

Since 1924, thousands of R-P Units have been adapted by industry to their toughest jobs.

R-P replaces storage batteries and charging equipment—makes the electric truck completely mobile—free from limitations imposed by use of batteries for truck power.

Automatic Platform Truck

R-P power plants are good for the life of the truck—handle the loads quickly.

Continuous Power

INDUSTRY TODAY needs Ready-Power more than ever before to handle materials faster, more economically, and to speed up production to the wartime pitch. Ready-Power equipped trucks handle more loads per hour, per day, per year, than the same equipment battery powered. Ready-Power (Gas-Electric) Units convert ordinary trucks into trucks with higher peak performance because of the continuous flow of power.

Peak Performance

The Ready-Power Company *does not make industrial trucks*—but supplies the gas-electric power plants that make electric trucks do more work. Truck manufacturers furnish Ready-Power equipment on new trucks at your request—or you can get Ready-Power units to replace batteries now in operation, direct from The Ready-Power Company.

Write for information, mentioning type of new truck contemplated or make and type of trucks now being operated.

Clark Tructractor

Mercury Tractor

THE READY-POWER CO.

3842 Grand River Avenue • Detroit Michigan, U. S. A.

OWI Photo by Palmer, in an Allegheny Ludlum Plant

Rx FOR ALLOY STEEL

[Accurate to 1/1000 of 1 per cent]

QUALITY in the manufacture of stainless steel—that is, high fidelity to the properties required, and consistent uniformity over shipment after shipment—requires constant control and research.

In Allegheny Ludlum laboratories, chemists weigh the elements of each stainless melt to determine its exact composition. Analysis is determined to 1/1000 of 1%, for each element in the steel. Nothing is left to chance that will prevent waste of these vital alloys, or protect the faithfulness of the steel to specifications.

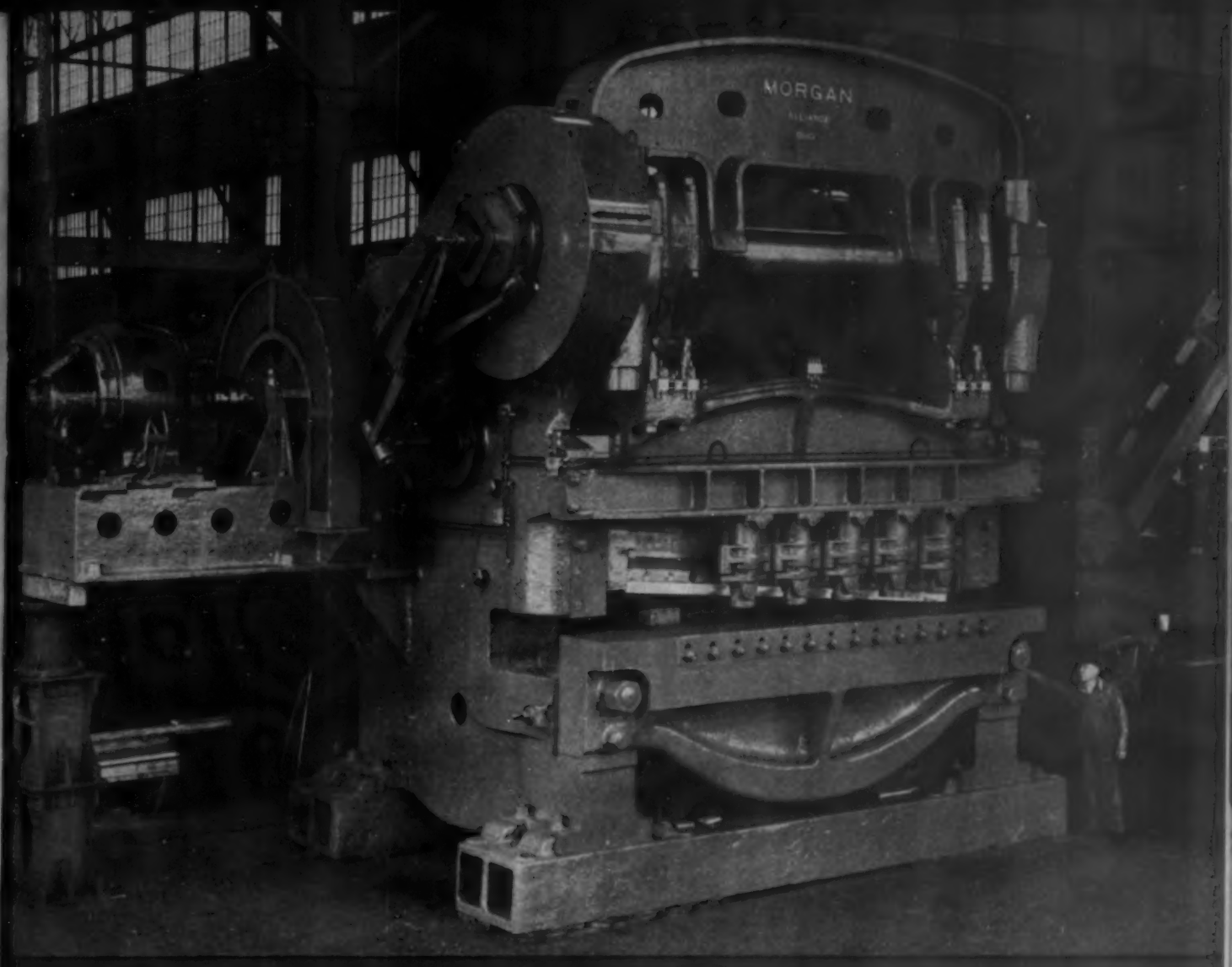
That is the background of Allegheny Stainless when it comes to you as a raw material. And it's only half the story. The major importance today lays in what you *do* with the steel . . . how fast you turn it into finished war equipment and parts; how little of it is wasted in rejects or spoilage. Stainless steel is a critical material; even the use of a high alloy, where a lower one would do the job, is a loss out of the nation's reserves.

● Can you improve your use of stainless, either to save time or material? Our help, printed or personal, is at your service.

ADDRESS DEPT. S-7

Allegheny Ludlum
STEEL CORPORATION
BRACKENRIDGE, PENNSYLVANIA

A-8843 . . . W & D



BUILT BY MORGAN *Engineering*

FOR SHEARING 2″ ARMOR PLATE

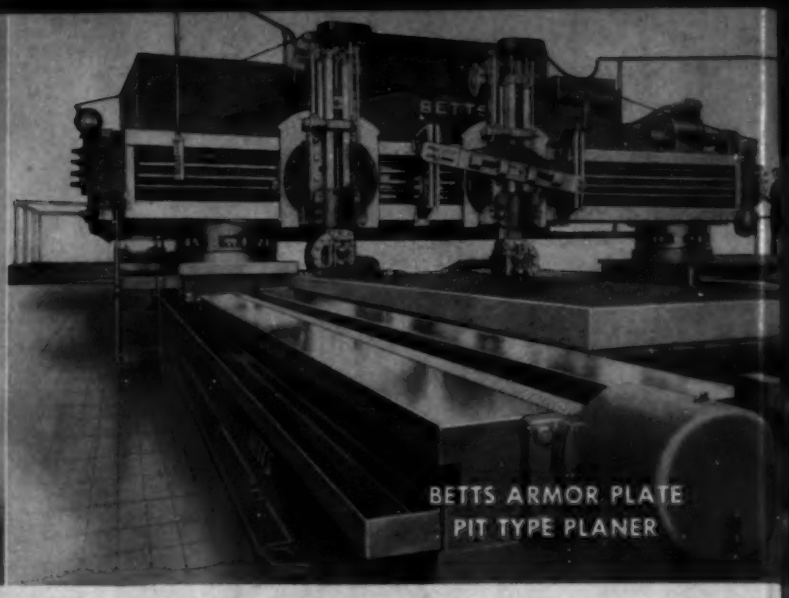
● Among the many types of mill equipment built by Morgan, is the 144″ plate shear illustrated above for shearing 2″ armor plate. Push button control is provided for operating the hydraulic clutch and hydraulic hold-downs. Of massive construction, this shear is typical of the type of mill equipment Morgan designs and builds. Morgan engineers rely upon a highly skilled shop organization, modern equipment and progressive ideas in building steel mill machinery.

DESIGNERS • MANUFACTURERS • CONTRACTORS
Blooming Mills • Plate Mills • Structural Mills
Electric Traveling Cranes • Charging Machines
Ingot Stripping Machines • Soaking Pit Cranes
Electric Welded Fabrication • Ladle Cranes
Steam Hammers • Steam Hydraulic Forging
Presses • Special Machinery for Steel Mills

THE MORGAN ENGINEERING CO.
ALLIANCE, OHIO

Pittsburgh, 1430 Oliver Building

BETTS 20 BORING MILL



BETTS ARMOR PLATE
PIT TYPE PLANER

NEWTON
COMBINATION ROTARY PLANER AND SAW

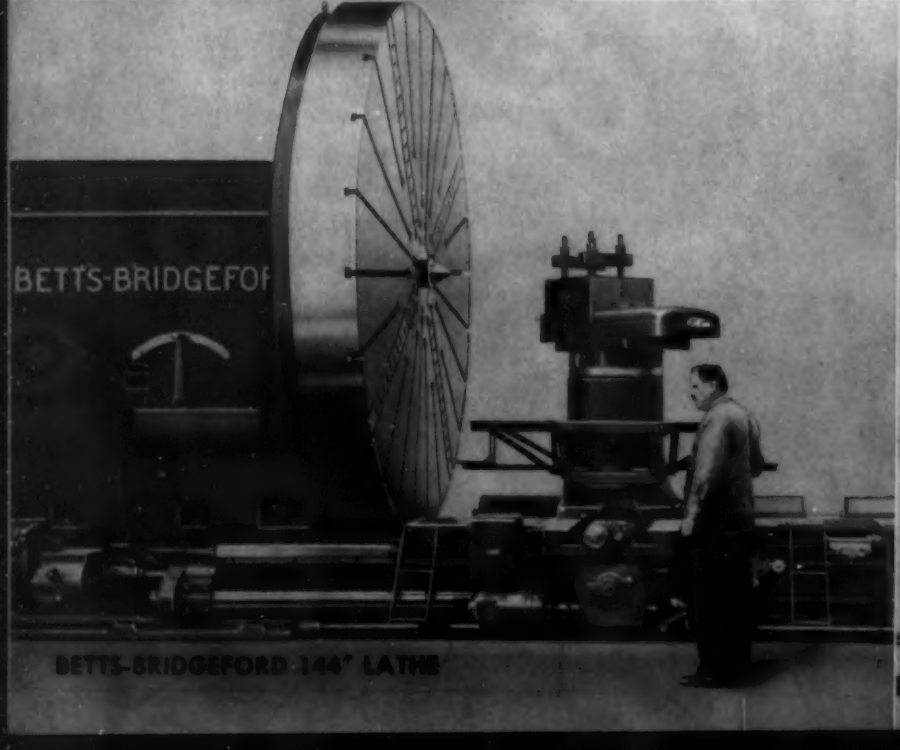
BIG MACHINES FOR BIG JOBS!

Whenever there are really big jobs to be done, Consolidated machine tools can be depended upon to do them. Shipyards, arsenals, tank factories and industrial plants are using Consolidated machines to do the heavy work so essential to the production of war material.

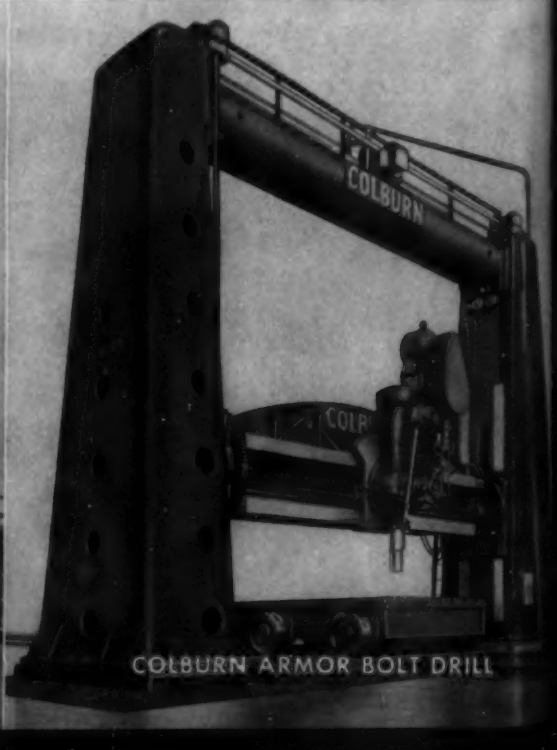
So well has Consolidated done its job that the Army-Navy "E" with three stars—denoting 18 months of outstanding production—proudly floats from the Consolidated flagstaff.

Some of the big Consolidated machines now doing valiant service in America's battle for ever increasing production are illustrated on this page. Consolidated has helped many a plant lick a production problem with specialized machine tools. If you have such a problem, we will be glad to work with you on its solution.

CONSOLIDATED
MACHINE TOOL CORPORATION
ROCHESTER 10, NEW YORK



BETTS-BRIDGEFORD 144" LATHE



COLBURN ARMOR BOLT DRILL

FOR WAR TODAY—FOR YOUR PRODUCTS TOMORROW

DIE CAST SHANKS FOR UNIFORM BUTTONS

Note the shanks on the buttons in the foreground

The War Department has announced that all of the brass buttons on the overcoats and blouses of enlisted men in the United States Army will be replaced as quickly as possible by plastic buttons with zinc alloy die cast shanks (the illustration above shows Navy and Merchant Marine buttons so made, also). The change will result in a saving of 365,000 pounds of metal this year by the Army alone.

This saving will make everyone very happy—except, possibly, the soldiers themselves. We are told that they will have to sew their own buttons on, or get a girl friend to do the job for them. After the change is made, however, the men in khaki will find that the new buttons are on to stay—thanks to the strength of zinc alloy die cast shanks imbedded deeply in the plastic.

7 DIE CASTINGS IN A SAFETY CAN ASSEMBLY

The safety can, below, is a boon to the wartime conservation program. It is designed to facilitate the storing and dispensing of volatile and inflammable liquids. The leak-proof spout and fill-opening prevent loss by evaporation, and special perforated fire baffles in both openings prevent ignition of the can's contents.

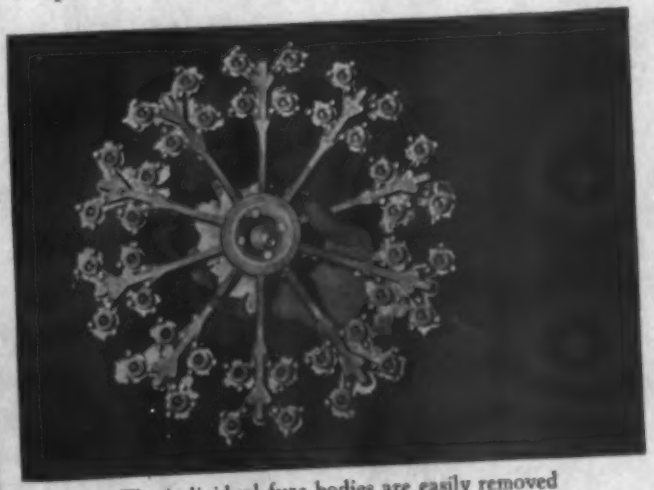
This can can be filled or emptied in one minute

The illustration reveals that the carrying handle, the spout assembly and the fill-opening hinge handle are all zinc alloy die castings. Because of the unusual shapes obtainable through the die casting process, the number of parts is reduced to an absolute minimum. Smooth, easily finished as-cast surfaces are an inherent quality of the castings, as is the necessary strength to withstand hard use.

40 SHELL FUZE BODIES CAST AT ONE TIME

40 Navy 20 MM. shell fuze bodies are cast at one time on the "gate" shown here—at the rate of 3 "gates" a minute. This speed of production, plus excellent physical and mechanical properties, makes zinc alloy die castings adaptable for critical ordnance components.

Does this, and the other applications on this page, give you a suggestion for improving your present war production? Does it offer possibilities for consideration in your post-war planning program? We will be glad to send you complete descriptive literature on zinc alloy die castings.



The individual fuze bodies are easily removed

THE New Jersey zinc ALLOY POT

A publication issued for many years by The New Jersey Zinc Company to report on trends and accomplishments in the field of die castings. Title Reg. U. S. Pat. Off.

STEEL MAGAZINE EDITION No. 12

THE NEW JERSEY ZINC COMPANY 160 FRONT ST., NEW YORK 7, N. Y.

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

This VEEDER-ROOT COUNTING DEVICE *is like a*

"WALKIE-TALKIE"

on all your production machines

Veeder-Root Magnetic Counters flash reports on production progress in bold black-and-white figures . . . so that machines can be kept in step every minute of every shift. These counters are especially adaptable to electronic and "electric-eye" applications. In fact, they can report from any distance, from machines in the plant to a central control board in the office *miles away*.

And there are other Veeder-Root Devices, for mechanical as well as electrical applications, which are adaptable to any type of machine. These devices are compactly constructed, easily installed, no trouble to maintain . . . and can be obtained to count in any terms or units of performance . . . turns, revs, pieces, trips, flashes, or what have *you?*

VEEDER-ROOT

INCORPORATED

Hartford, Connecticut, U. S. A.

DEPENDABLE
DRAW BENCHES
THE VAUGHN MACHINERY COMPANY
CUYAHOGA FALLS, OHIO, U. S. A.
COMPLETE COLD DRAWING EQUIPMENT
Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

In the manufacture of the Pettibone Mulliken Light-Weight Welded Dipper, the hood sections are welded around plates of N-A-X High Tensile Steel. This type of construction for the body section results in a reduction of weight as compared with the old type solid cast dipper. This reduction in weight enables the capacity of the dipper to be enlarged. The consequent increase in payload amounts in certain cases to as high as 30%.

N-A-X High Tensile was used in these Pettibone Mulliken Light-Weight Welded Dippers because it has the properties necessary for equipment of this kind—high strength with substantial weight saving, high resistance to abrasion and corrosion, high resistance to impact and fatigue under widely varying temperatures, and excellent weldability.

If you have need for a high tensile steel of unusual qualities, it will pay you to investigate N-A-X High Tensile. Send for your copy of a new booklet describing N-A-X High Tensile and the N-A-X 9100 series of steels.

GREAT LAKES STEEL CORPORATION
Detroit, Michigan
Sales Offices in Principal Cities

NATIONAL STEEL

Division of
NATIONAL STEEL CORPORATION
Executive Offices · Pittsburgh, Pa.

The Fighter Plane "*Borrowed*" Something Old from the Governor

IT MAY BE surprising to learn of vehicle engine governors having something in common with modern combat planes. In governor design, the problem was one of space limitations...and, of course, precision. So designers selected the Torrington Needle Bearing since it combined, happily, the necessary small size with a friction coefficient low enough to assure a high degree of accuracy in governor operation.

Builders of fighter planes, on the other hand, were confronted with an entirely different set of problems. A bearing for manual control mechanisms must not only conserve space and weight, but respond instantly—time after time. Yet strangely, or perhaps not so strangely, military aircraft manufacturers found what they, too, were looking for in the Needle Bearing. And other features as well, which came in mighty handy as the war took increasingly to the air.

In addition to this unique anti-friction bearing's compact design there was its effective lubrication, which helps keep 'em flying miles and often whole continents from maintenance stations... high unit capacity, meeting the rigid load and weight requirements of these fast, maneuverable aircraft... ease of operation, giving our pilots one more important edge in aerial combat...and ready availability—a vital factor helping to maintain and speed up our plane production.

NEEDLE BEARINGS—ALL TYPES—ALL SIZES

NEEDLE BEARINGS TYPE DC are complete, self-contained units consisting of a full complement of rollers and a drawn, hardened outer race. They offer the advantages of small size, low cost, high capacity—and easy installation.

NEEDLE BEARINGS TYPE NCS consist of a full complement of rollers and a relatively heavy hardened outer race. They are furnished with or without inner races. Needle Bearings Type NCS are adaptable to heavier loads than Needle Bearings Type DC.

NEEDLE ROLLERS TYPE LN are produced in a range of types and sizes for assembly on the job into low-cost, high-capacity, anti-friction bearing units. Our engineering department will be glad to advise on the correct size and type for any application.

DOES THIS SUGGEST TO YOU POSSIBILITIES for adapting the Needle Bearing to your postwar designs? The people you serve are going to want, in their own products after Victory, the revolutionary principles that have improved performance and cut costs in war production. And the Needle Bearing offers all of them—light weight, compact design, infrequent lubrication, dependable operation, plus installation ease unique in an anti-friction bearing. For preliminary information, write for Catalog No. 110, which lists sizes, ratings and typical applications. Then let Torrington engineers help you work out whatever specific service problems may develop.

THE TORRINGTON COMPANY

Established 1866 • Torrington, Conn. • South Bend, Ind.

Makers of Needle Bearings and Needle Bearing Rollers

New York · Boston · Philadelphia
Detroit · Cleveland · Seattle
San Francisco · Chicago · Los Angeles
Toronto · London, England

TORRINGTON NEEDLE BEARINGS

It's a fair question

WHY GET A WELLS NO. 8?

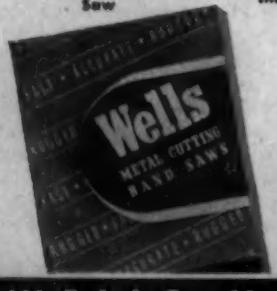
WELLS No. 8
Capacity: Rectangle—8" x 16"
(spec. bowed guides)—5" x 24"
Rounds—8" dia.
Speeds: ft. per min. 60, 90, 130
Motor—Specifications optional

No. 20
Designed for cutting risers off propeller blades

No. 12
Heavy duty production Saw

No. 9
General Foundry Saw

STOCK STANDS
Indispensable item for your shop



Wells SAWS
THE SIGN OF SERVICE

Here's why!

VERSATILE — Wells No. 8 Metal Cutting Band Saw will cut a wide variety of metals in various shapes. In single or ganged-up work it will take overall sizes up to 8" x 16" rectangles or 8" rounds.

ACCURATE — Vibrationless operation assures uniform cutting.

FAST — The continuous cutting method employed insures a cool blade thus enables the operator to obtain maximum cutting speed for the type of stock being cut. Adjustable to 3 speeds.

ECONOMICAL — Cutting capacity and quality are paramount factors in choosing a WELLS Saw. Then too, it requires but a ½ H.P. motor and 2' x 6' of floor space.

Ask your mill-supply dealer to show you a WELLS, Model 8, in actual operation — you'll like its performance.

A large stock of blades is available at all times

To get complete specifications on WELLS Saws, write for the new WELLS Catalog.

Wells Has Established Leadership

WELLS MANUFACTURING CORPORATION

METAL CUTTING BAND SAWS

1515 FILLMORE STREET • THREE RIVERS, MICHIGAN

TO MARK PROGRESS

Controlled Quality...

The Ladish Drop Forge Co. symbolizes over 41 years of continuous service to American Industry. Forward-looking scientific experts, outstanding manufacturing facilities and exacting metallurgical control have been combined to produce unexcelled, controlled-quality forgings.

LADISH DROP FORGE CO.

CUDAHY [illegible] WISCONSIN

A BIRTHDAY STATEMENT ABOUT "MX" WHEELS

THE announcement of "MX" Wheels in 1942 introduced a new abrasive tool to industry.

These wheels were created by Carborundum to perform a specific function—the removal of "disturbed metal" such as burrs and tool marks, resulting from grinding, machining, boring and similar operations.

Research and field tests showed "MX" Wheels could do this job better than ordinary finishing methods. A year's experience has confirmed their advantages.

"MX" Wheels, fabricated from cotton fibre intermingled with abrasive grains are unlike any other abrasive product. They have unique characteristics.

Because of their "cushioning" effect "MX" Wheels literally hug the work. Chatter and vibrations are reduced, smooth finishes assured.

"MX" Wheels are best suited for breaking corners, removing burrs and polishing grooves or slots. For burr removal on jobs where surrounding surfaces must be kept free of abrasive marks . . . or for polishing which must be done with light stock removal to maintain tolerance limitations . . . they are ideal.

A request addressed to us, Dept. S, at Niagara Falls, will bring you literature further describing the wheel and illustrating a few of its many uses.

CARBORUNDUM
REG. U. S. PAT. OFF.
ABRASIVE PRODUCTS

THE CARBORUNDUM COMPANY, NIAGARA FALLS, N. Y.

REG. U. S. PAT. OFF.

MANUFACTURERS OF GRINDING WHEELS, COATED ABRASIVES, SUPER REFRACTORIES, HEATING ELEMENTS

Sales Offices and Warehouses in New York, Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh, Cincinnati, Grand Rapids

(Carborundum and Alozite are registered trade-marks of and indicate manufacture by The Carborundum Company)

You Don't Know How Lucky You Are

... Lucky that medical directors, industrial nurses, and safety engineers are doing the fine job they are in keeping limited man-power effective and productive ... lucky that these far sighted executives developed the tools and techniques to fight occupational disease and accidents before war pressure made the need for them acute.

One such technique is a "Planned Procedure" featuring a new product designed to *combat* industrial dermatitis, not merely guard against it.

This new product, TARBONIS CREAM, has proved its effectiveness in ridding plant after plant of dermatitis due to cutting oils, chemical exposure, and some of the most difficult irritants in a dozen different industries. The proof is in its rapid acceptance by trained men in industry —the men who know.

An industrial physician and a progressive safety engineer in an Ohio ordnance plant, troubled with an average of 30 to 40 new cases of dermatitis a week, worked out a plan and procedure using TARBONIS CREAM. More than six months have passed, and not one case of occupational dermatitis has developed in that plant.

One of the world's largest plastics companies voluntarily wrote users of their irritating phenol-formaldehyde resins that a procedure using TARBONIS CREAM had proved the most effective method in twenty years of effort.

Here are examples of what medical directors, safety men, and first aid departments accomplish when they have the tools to work with, and the cooperation they must have to complete their vital work.

If occupational skin irritations are causing a problem in your plant, this "Planned Procedure" may solve it. Write for full details.

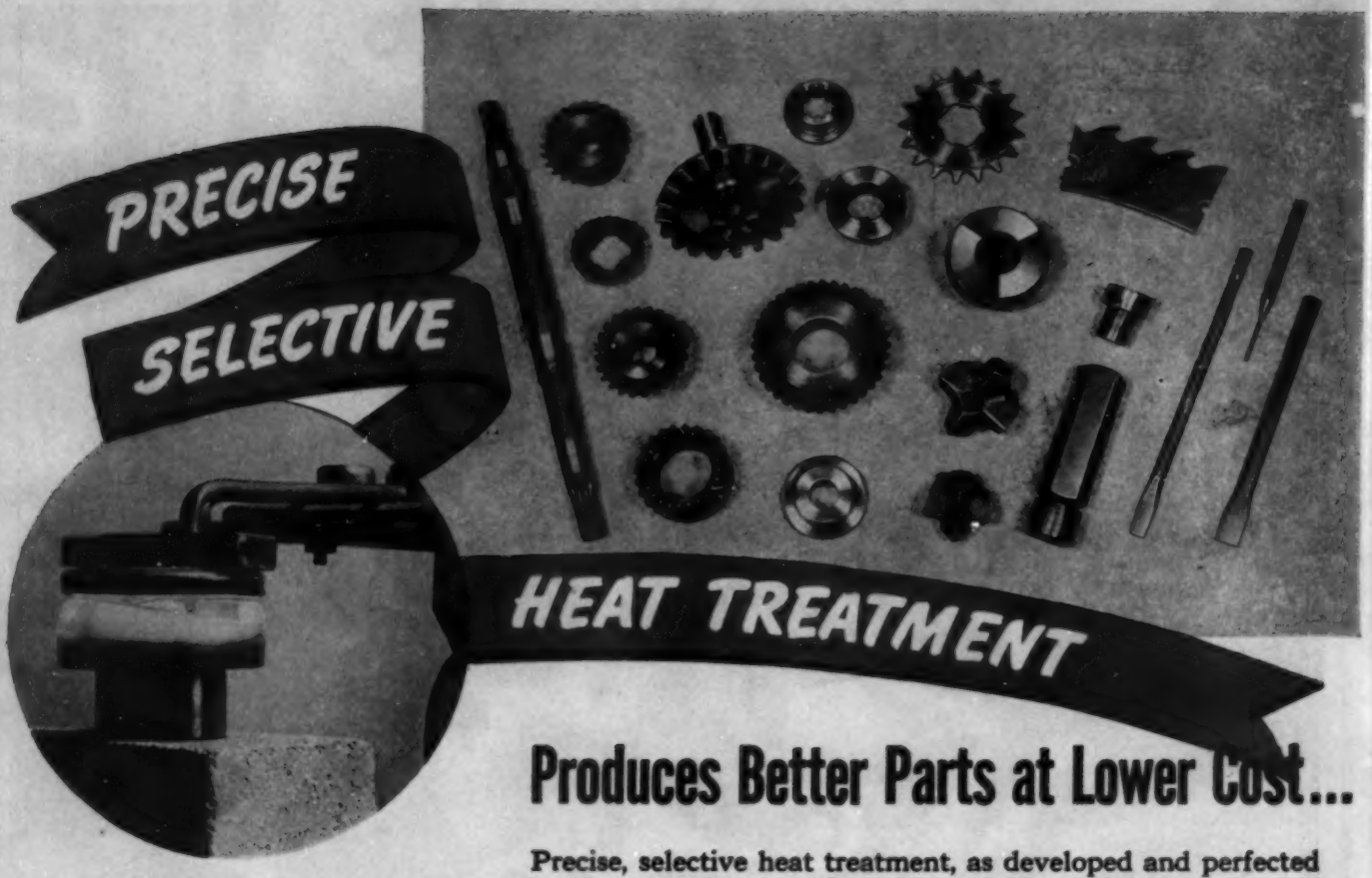
Listed below are a few, less than one per cent of the total number, of companies in one or more of whose plants TARBONIS CREAM is now at work.

THE TARBONIS COMPANY
1220 HURON ROAD • CLEVELAND, OHIO

ALUMINUM COMPANY OF AMERICA • ATLAS POWDER • BOHN ALUMINUM AND BRASS • CRAMP SHIP-BUILDING • CURTISS-WRIGHT • E. I. DuPONT DeNEMOURS • DUREZ PLASTICS AND CHEMICAL GENERAL ELECTRIC • GENERAL MOTORS • JACK & HEINTZ • NASH-KELVINATOR • WAYNE-BENDIX

Tarbonis
cream

FOR INDUSTRIAL SKIN IRRITATIONS



Heat treating the wearing face of a coupling by the Lepel High Frequency Induction Heating Process. Toughness and ductility of the balance of the part is unimpaired.

The heart of precise, selective heat treating, the Lepel High Frequency Induction Unit—compact, easily movable, relatively inexpensive. Operated manually or fully automatic.

Produces Better Parts at Lower Cost...

Precise, selective heat treatment, as developed and perfected by Lepel, permits the application of heat up to any selected temperature, *exactly* where it is required and for the *exact* period of time necessary to produce the desired result.

Amazing in its speed, Lepel equipment reduces from minutes to seconds the time required for hardening, annealing, stress relieving and for brazing and soldering—the same unit performing all of these operations. Yet it maintains a degree of precision and uniformity rarely attainable through other methods.

Fully automatic operation is possible, eliminating the human equation and assuring speed, economy, conservation of manpower and critical materials and a minimum of rejections.

Lepel equipment achieves the ultimate in simplicity of operation, dependability and cleanliness. As a result, Lepel installations in many leading war industries are operated entirely by women.

While Lepel equipment has been a boon to wartime production, it is instantly adaptable to peace-time applications without any conversion whatever.

Write or wire for complete information, or, better still, send us samples of your work with specifications for heat treating, brazing or soldering. Our engineers will then perform the work specified and return the samples with specific data, recommendations and cost estimates. This service entails no expense or obligation on your part.

Lepel

LEPEL HIGH FREQUENCY LABORATORIES, Inc.

PIONEERS IN INDUCTION HEATING

39 West 60th Street • New York, N. Y.

HIGH FREQUENCY INDUCTION UNITS

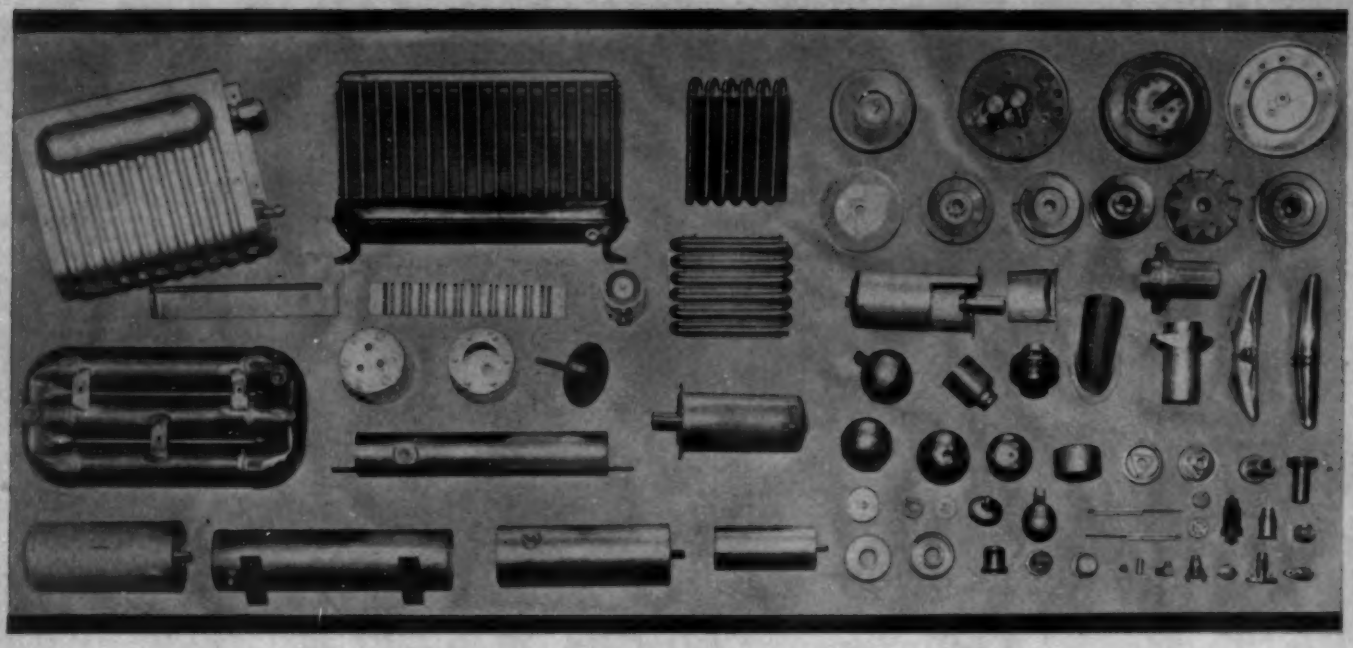
HA-HA! HE THOUGHT A SNAKE BIT HIM! I DON'T SEE HOW A GUY COULD BE ABSENT-MINDED ENOUGH TO THINK THAT A SNAKE WOULD BE IN A BIG MODERN PLANT LIKE THIS!
THAT'S JUST TH' REASON! IT'S SO MODERN THAT ONLY A FEW MONTHS AGO WE WAS PICKIN' WILD BERRIES RIGHT ABOUT HERE--AND THERE WAS SNAKES IN TH' BUSHES!
T. M. REG. U. S. PAT. OFF.
COPR. 1943 BY NEA SERVICE, INC.
MEMORY LANE
J.R.WILLIAMS
3-5

THAT WAS THE DAY HE TALKED THE BOSS INTO "CHIP BREAKERS."

Chip Control avoids dangers and delays caused by long, hot, tough chips of alloy steel. Chip Control yields **short chips** that are more marketable, bring a better price, and provide a means for speedy recovery of alloys on a national scale.

For a proved method of producing **short chips** with Firthite Sintered-Carbide Cutting Tools, refer to pages 41, 42, and 43 of the Firthite Users' Handbook. Ask for Handbook FE-101.

ARMY E NAVY
Firth-Sterling
STEEL COMPANY
Offices: McKEESPORT, PA. · NEW YORK · HARTFORD · PHILADELPHIA · CLEVELAND · DAYTON · DETROIT · CHICAGO · LOS ANGELES



Some parts and products joined by the electric furnace copper brazing process—assemblies ranging in size from small metal radio tube parts to large automotive and refrigerator units are joined neatly, securely and economically by this process.

Design Your Metal Parts For Copper Brazing

Miscellaneous steel assemblies are joined 60% to 75% faster at ¼ the former labor cost by the copper brazing process.

"Greatly improved results—neater, stronger joints—60 to 75% faster, at about one quarter the former labor cost," that briefly is the report received from the production manager of a prominent midwestern plant after installing an EF continuous copper brazing furnace for joining some of their steel assemblies.

Within a month after installing their first brazing furnace, a second similar but larger furnace was ordered for joining other products—both furnaces are now operating side by side, joining all kinds of assemblies—large and small—neatly, economically and securely.

Products difficult or expensive to make in one piece can be made in several pieces and joined—thus not only reducing the cost but actually improving the quality and appearance. Products requiring several stampings joined or requiring screw machine parts, forgings and stampings to complete the unit, can be neatly and economically joined right in the production line in your shop. Strong, leak-proof joints are made and the completed unit is discharged from the furnace—clean and bright.

Any number of joints in the same product or any number of pieces can be joined at one time. The most intricate parts or assemblies are made to actually "grow together," and joints made which are as strong, or even stronger than the original parts. On some parts it is possible to anneal and braze in one operation.

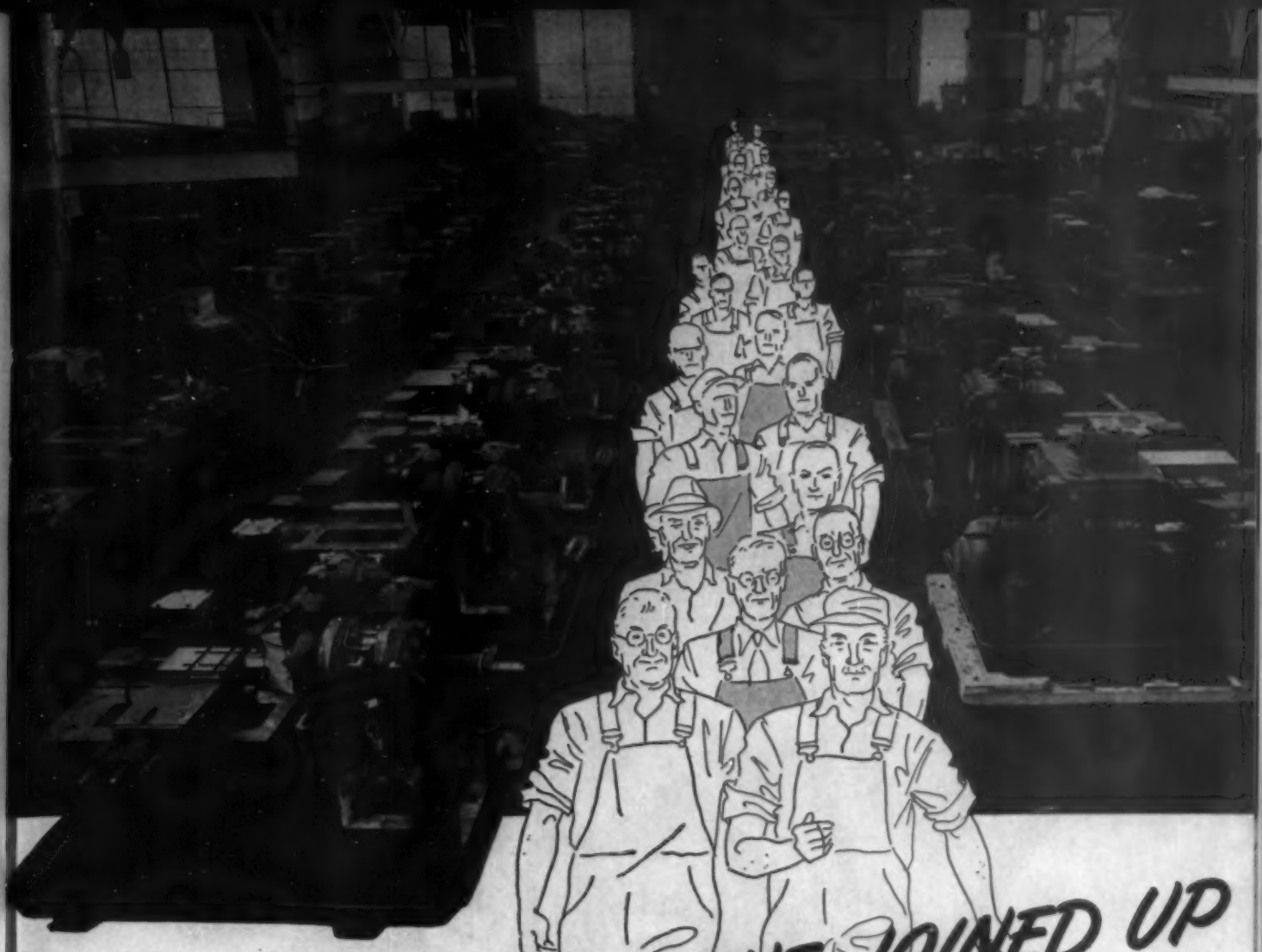
Investigate the brazing process for your products. With slight changes in design you may be able to join your metal assemblies, neater, cheaper and stronger by this method.

Send for printed matter showing various types of EF copper brazing furnaces.

Investigate the Copper Brazing Process For Joining YOUR Metal Parts

The Electric Furnace Co., Salem, Ohio

Gas Fired, Oil Fired and Electric Furnaces---For Any Process, Product or Production

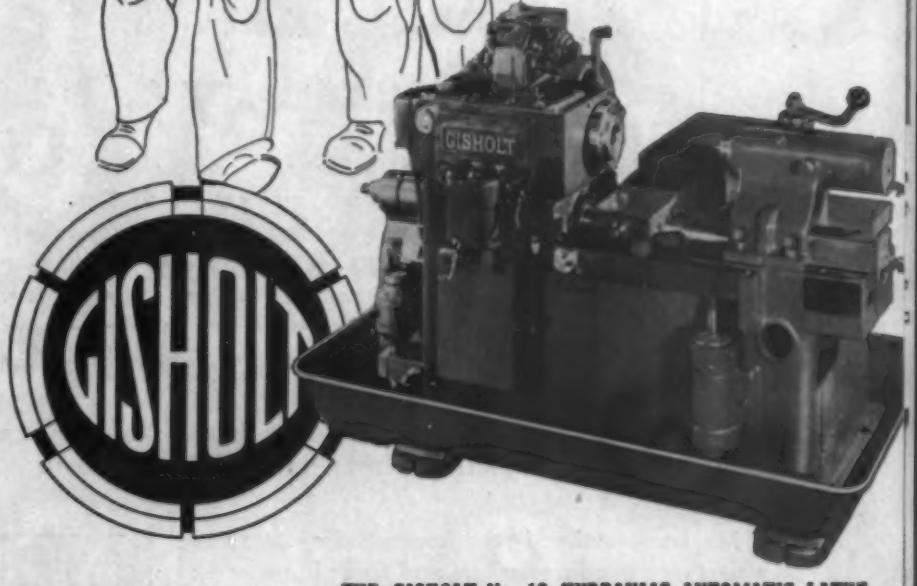


THE "VETERANS" HAVE JOINED UP

"Veterans" because of the long experience behind them . . . because of their ability to produce in large volume . . . . these Gisholt No. 12 Hydraulic Automatic Lathes are entering war production in greater numbers.

This is a case of effective wartime conversion by the McDonald Plant of the Continental Can Company. In peacetime, this plant builds can-making machinery. In war, its modern facilities have been contributing most effectively by producing these high speed automatic lathes. This lot of "veterans" is now on the job, turning out parts for vital equipment in unprecedented quantities.

GISHOLT MACHINE COMPANY
1217 East Washington Avenue, Madison, Wisconsin



Look Ahead . . . Keep Ahead . . .
With Gisholt Improvements in Metal Turning

THE GISHOLT No. 12 HYDRAULIC AUTOMATIC LATHE ca out-produce two, three, or even four, manually operate machines. Yet, it is so simple to run that one man (o woman) can frequently tend several machines. Literatur on request.

TURRET LATHES · AUTOMATIC LATHES · BALANCING MACHINES

BOHN

A Widely Known Name Backed by a World of Experience

All Bohn plants are operating at full capacity on war work. Bohn engineers, metallurgists and research staffs are gaining new and rich experiences which are proving of great importance to our vital war production. Bohn has developed new and better methods of producing various aluminum, magnesium and brass products as well as aircraft-type bearings. All of these Bohn products are known throughout the world for their high quality and many economic advantages.

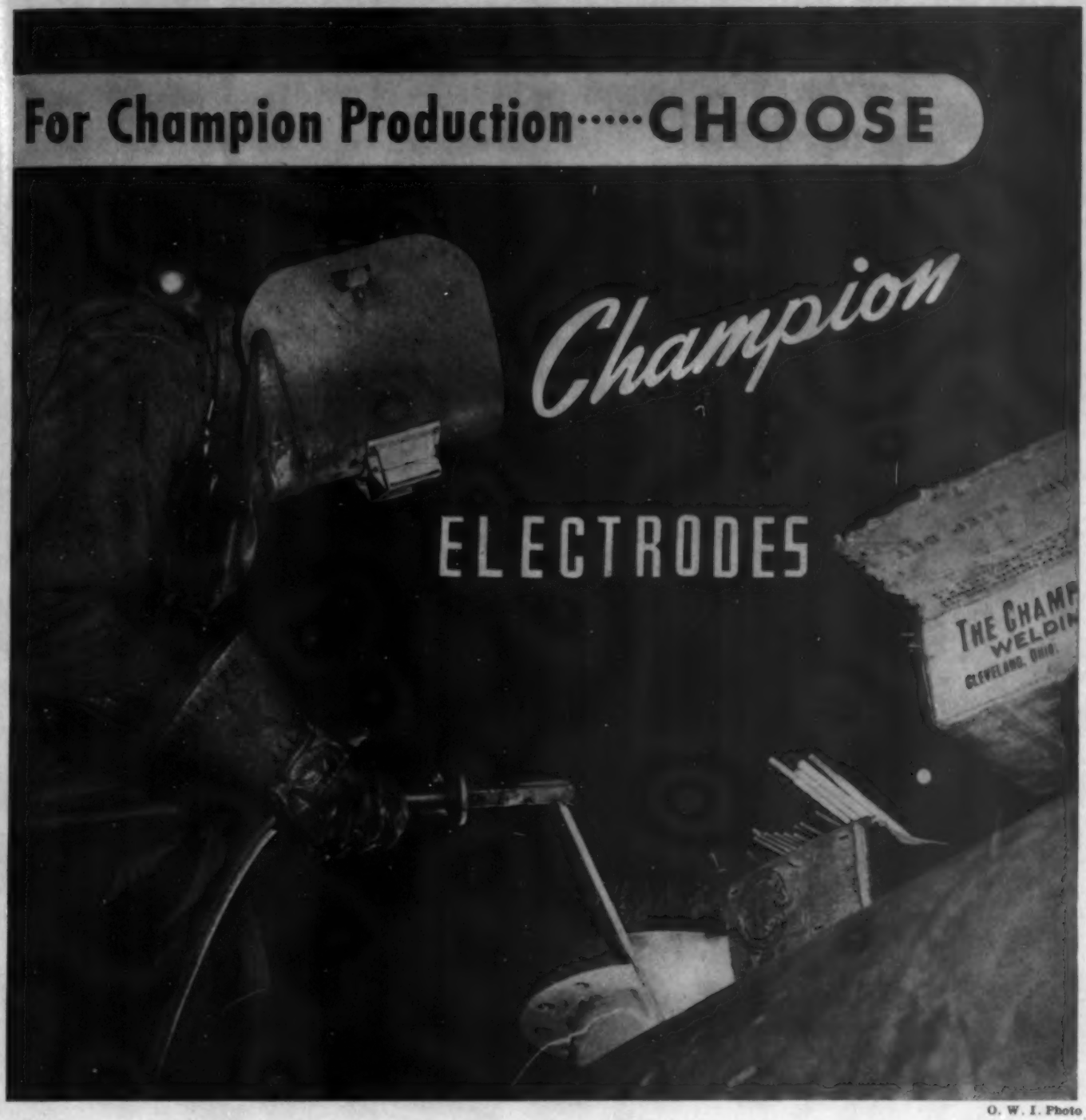
So we want you to become better acquainted with the name BOHN and the products that bear this well known mark of distinction.

Maybe sometime in the future, Bohn can make a part or a product for you and make it better, at less cost. Some day we hope you will give us careful consideration, for we believe you will find it advantageous to do business with the Bohn organization.

CONSULTANTS TO AMERICAN INDUSTRY

BOHN ALUMINUM AND BRASS CORPORATION
GENERAL OFFICES—LAFAYETTE BUILDING
DETROIT, MICHIGAN
Designers and Fabricators
ALUMINUM - MAGNESIUM - BRASS
AIRCRAFT-TYPE BEARINGS

For Champion Production·····CHOOSE



O. W. I. Photo

When exceptionally high quality of welds is required such as in the case of the boiler drums for our Merchant Fleet, Champion Red Devil "75" electrodes are usually employed. They produce sound, clean welds of high quality. The alloying elements in the coating impart high resistance to fatigue and heat.

"Be sure it's a stub before it's thrown away."

Photo Shows Champion Red Devil "75" electrode being used on a marine boiler drum in a large midwest plant.

RED DEVIL • BLUE DEVIL • BLACK DEVIL • GRAY DEVIL

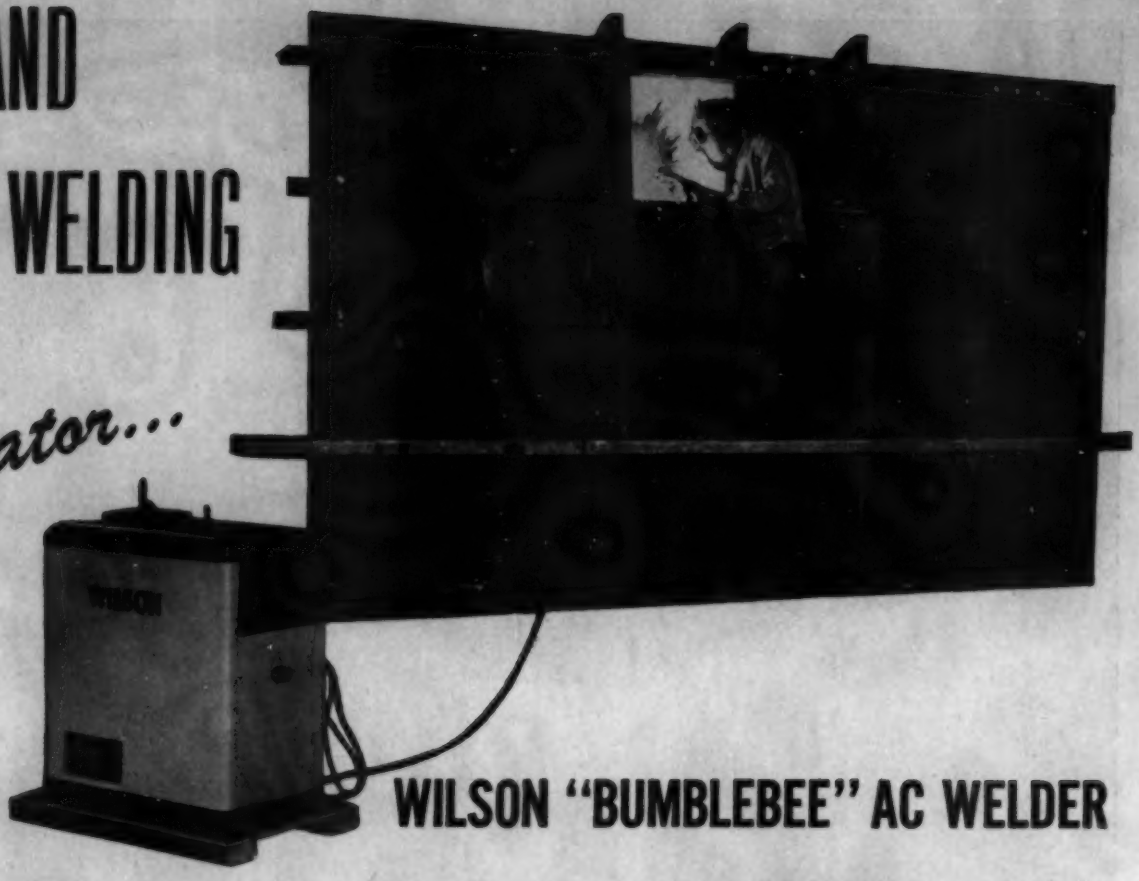
THE CHAMPION RIVET COMPANY

11200 HARVARD AVENUE—CLEVELAND, OHIO

EAST CHICAGO, INDIANA

MORE AND BETTER WELDING

Per Operator...



WITH THE WILSON "BUMBLEBEE" AC WELDER

If you're looking for 15-25% faster welding with improved weld deposits, use the Wilson "Bumblebee" AC Welder. This new AC welding machine helps you save in three important ways:

1. *Save Power* as much as 40% because there's no idling loss with AC machines.
2. *Save Time* through the use of larger electrodes and heavier welding currents.
3. *Save Electrodes* because the bigger electrodes used with AC mean fewer stubs in a given length of weld.

In addition, the Wilson "Bumblebee" can be delivered sooner than equivalent DC machines because it requires much less sheet steel and copper. Maintenance, too, is simplified because there are no heavy rotating parts on the "Bumblebee".

Made in 300 and 500 ampere sizes, the "Bumblebee" may be equipped with wheels for extra portability at small additional cost. Write your nearest Air Reduction office for complete details.

AIRCO No. 230 AC ELECTRODE

For superior AC welding *in all positions* use Airco No. 230. Thanks to its special coating, its spraying action and stronger arc, Airco 230 gives faster and better welding in the flat, vertical or overhead positions. Available in 1/8" and 5/32" diameters, 14" length. Write any Air Reduction office for details.

Air Reduction

Buy United States War Bonds

General Offices: 60 EAST 42nd ST., NEW YORK 17, N. Y.

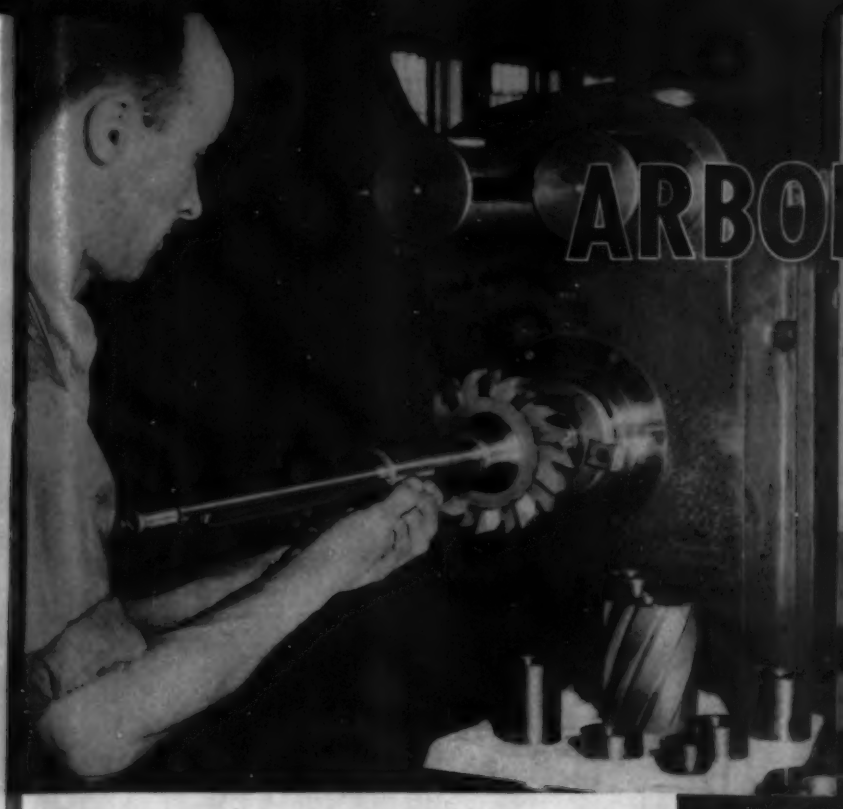
IN TEXAS: MAGNOLIA-AIRCO GAS PRODUCTS CO.

General Offices: HOUSTON, TEXAS

AIRCO

WILSON

IDLE CYLINDERS ARE PRODUCTION SLACKERS: *Keep 'em rolling for victory!*



USE YOUR ARBORS PROPERLY

— to help speed production

It takes the best utilization of arbor equipment for cutters and machines to achieve maximum production. Do all in your power to keep these vital tools in service when replacement is so difficult.

Follow these simple precautions to keep them on the job —

BEFORE INSERTING any arbor in a machine, clean dirt or chips from the shank and from the machine taper hole — thereby assuring proper seating. This provides a true drive. It's a must to obtain accurate work and prevent excessive cutter wear.

CLEAN THE FACES of the sleeves and bushings to provide accurate running.

BE SURE arbor is well supported and of ample diameter.

ALWAYS use a cutter driving key to prevent slippage and consequent damage to cutter, arbor, or work.

Except on very short arbors and those of Shell End Mill type, **DO NOT TIGHTEN** the arbor nut until the arbor is supported by a yoke. Such abuse results in distorted arbors.

BE CAREFUL not to run the work or some part of the machin into an arbor. Such action may spring it and cause damage t cutting tools.

WHEN NOT IN USE, arbors should be kept in racks where the may be found easily and not subject to injury from other heavy c sharp tools.

Your conservation of arbors will help you do more and better work and will result in increased cutter efficiency and longer machine life. It's **another** way to help in the united war effort.

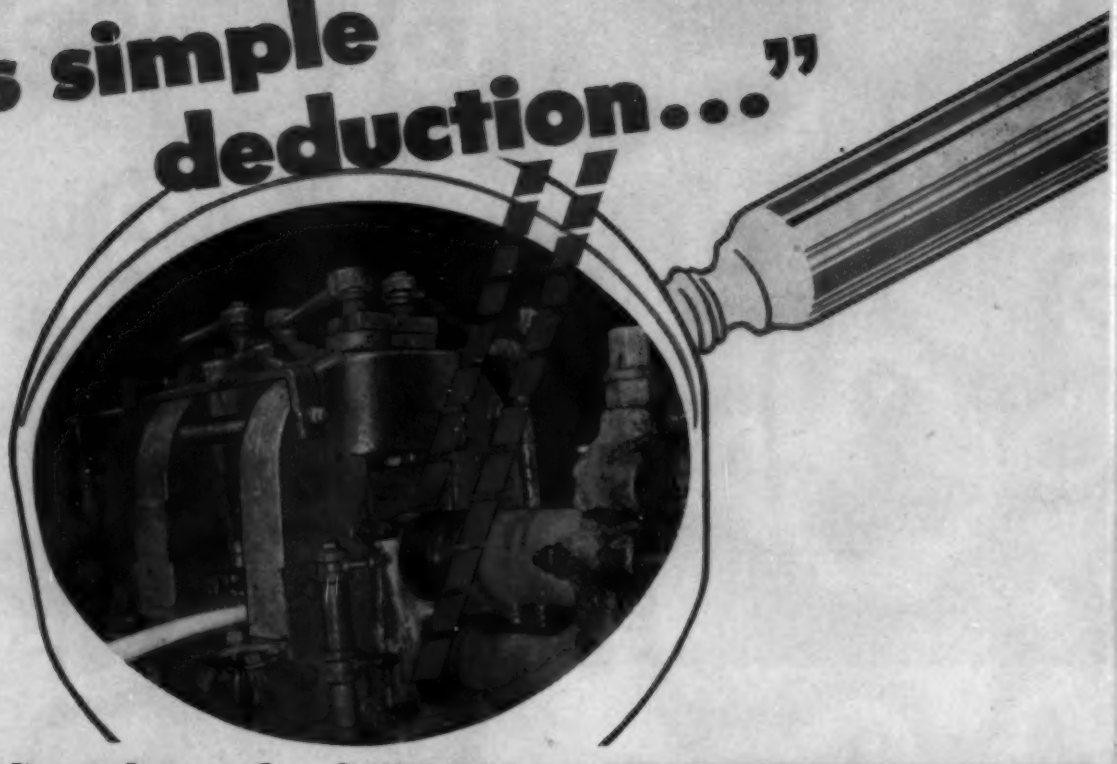
We are proud to be honored with the Navy "E", awarded for outstanding accomplishment in Defense production.

Brown & Sharpe Mfg. Co.
Providence, R. I., U. S. A.

Reproductions of this advertisement for use on your bulletin board furnished on request.

BROWN & SHARPE

"It's simple deduction..."



...to select the right grade of MICARTA for every Roll Neck Bearing application

Examine the performance curves of the three grades of Micarta Roll Neck Bearings shown in Charts A and B, and make your own deductions. Selection of the right grade to fit the application is as easy as it is logical.

Take GRADE 271, for example. Chart A shows that it has the highest compressive strength. This is because GRADE 271 is mineral-filled. Chart B shows that the coefficient of friction for this grade is about the same as other grades at 600 feet per minute.

GRADE 271 is clearly the one to specify for high-pressure, high-speed applications such as finishing stands.

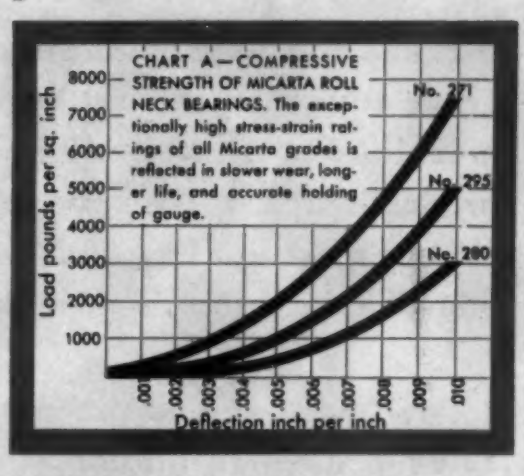
GRADE 295, on the other hand, has the lowest coefficient of friction at slow speeds because it is graphite-filled, gives a smoother bearing surface. It is next highest in compressive strength.

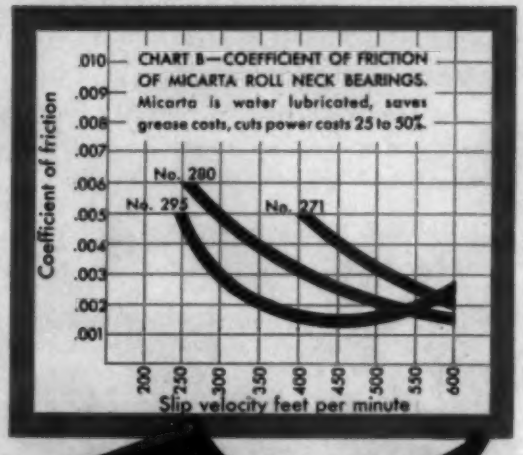
GRADE 295 meets the need for long life at slow speeds such as is encountered in roughing stands and structural mills.

Performance curves for GRADE 280 indicate that while this grade does not star when compared with other Micarta grades, it is still vastly superior to bearings of babbitt materials.

GRADE 280 can be used for general miscellaneous applications such as rod, skelp and bar mills.

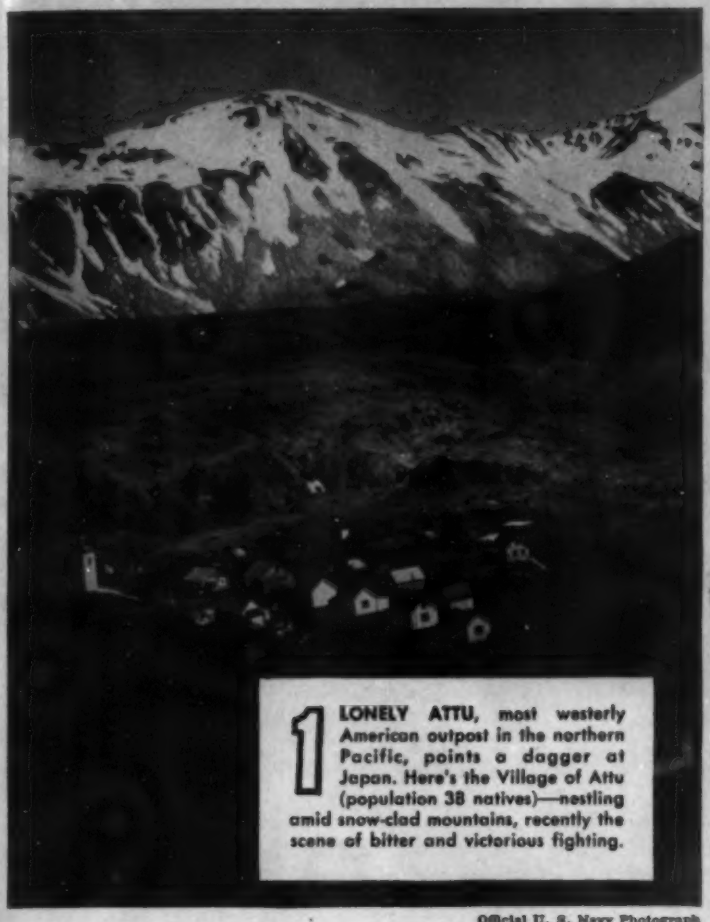
However, there's nothing so convincing as a test run on one of your own mills. Consult your Westinghouse Representative for complete details. Or write Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Dept. 7-N. J-06330





Westinghouse Micarta

FAMOUS LIFE LINES



1 **LONELY ATTU,** most westerly American outpost in the northern Pacific, points a dagger at Japan. Here's the Village of Attu (population 38 natives)—nestling amid snow-clad mountains, recently the scene of bitter and victorious fighting.

Official U. S. Navy Photograph

2 **U. S. SCOUT CARS** roll in review before the commanding officer in New Caledonia. Thousands of military vehicles of more than 40 different types are equipped with "life lines" of Bundy Tubing vital to their construction and operation.

Official Signal Corps Photograph

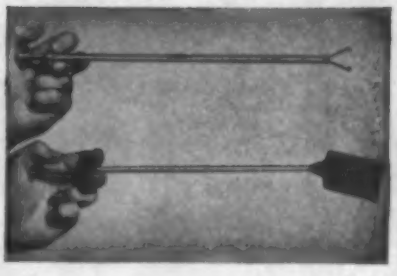
JUST as the life of an army overseas depends on its lines of supply—so the fighting life of a plane, a tank or a ship depends on slender lines of metal tubing.

Gas, oil, brake and pressure lines for every type of vehicle. Fuel lines for marine engines. Structural and mechanical tubing for radios, aircraft, gliders and tanks. Refrigeration lines for the powder rooms of war vessels.

Bundy makes them all, and many more — tubing used for more than 5,000 *different* parts in the vehicles and equipment of our fighting forces.

These life lines *must not fail.* They must stand up under the toughest kind of punishment on faraway fronts. So Bundy builds the best tubing it can build — in the largest quantity possible in greatly expanded plants.

We'll keep on doing just that until Victory — when we shall turn again to the service of peacetime industry. Bundy Tubing Company, Detroit, Michigan.



SPECIALIZED TOOLS, made with Bundy Tubing, are helping the aircraft and other industries more quickly to install and inspect small parts. Bundy Tubing was selected because of its light weight and sturdy strength.

BUNDY TUBING

ENGINEERED TO YOUR EXPECTATIONS

Buy U. S. War Bonds
Get in Your Scrap

BUNDYWELD double-walled steel tubing, hydrogen-brazed, copper-coated inside and outside. From Capillary sizes up to and including $\frac{1}{2}$" O. D. This double-walled type is also available in steel, tin-coated on the outside, and in Monel.

BUNDY ELECTRICWELD steel tubing. Single-walled — butt welded — annealed. Available in sizes up to and including 2" O. D. Can be furnished tin-coated outside in smaller sizes.

BUNDY "TRIPLE-PURPOSE" tubing. Double-walled, rolled, from two strips, joints opposite, welded into a solid wall. Available in all Monel; all steel; Monel inside—steel outside; Monel outside—steel inside. Sizes up to and including $\frac{5}{16}$" O. D.

CLEAN METALS WITH COMPOUNDS DEVELOPED FOR *INDIVIDUAL* PROBLEMS

MacDermid compounds for cleaning basis metals are faster and more positive *because they are different* . . . they are individually formulated for individual metals and methods. Special formulations may now be had for war materials that have been tested and approved and recommended by leading manufacturers. Let us show you the compound that has been perfected for your problem.

WRITE FOR THESE INFORMATIVE, NEW, FOLDERS . . . and see for yourself why so many others are relying on MacDermid compounds to speed up and improve their products . . . *There's a Compound for Every Cleaning Problem.*

ANODEX **The original *Reverse Current* process for electro-cleaning ferrous metals that is now recognized as the fastest and most economical procedure prior to finishing or plating. ANODEX compounds are individually formulated for more positive results and are guaranteed to produce a chemically and metallurgically clean basis metal.**

METEX **Individually formulated compounds for use where the reverse current ANODEX principle does not apply. Special METEX compounds have been developed for positive cleaning of aluminum, aluminum alloys, copper and brass that are faster, *because they are individually formulated,* and are now available in various degrees of potency for most products of war.**

Other Compounds for Other Problems

SALES AND SERVICE from COAST TO COAST
New York Cleveland Los Angeles
Chicago Detroit St. Louis
Newark Philadelphia
Toronto, Canada

MAC DERMID
INCORPORATED
WATERBURY, CONNECTICUT

RACO TYPE D GIVES A TENSILE STRENGTH OF 60,000 LBS. PER SQ. IN.

Instead of wondering where and when you can get Shielded Arc Electrodes . . . why not try RACO Type D Composite Electrodes?

RACO Type D has been used for over ten years by the largest automobile manufacturers . . . on hundreds of jobs . . . both automatic and manual . . . where high speed is vitally important and high stress is not a factor.

But tests have proved that a tensile strength of 60,000 pounds per square inch is obtainable with RACO Type D Composite Electrodes . . . far more than is required for most sheet metal work . . . and more than sufficient for many types of general welding of mild steel for storage tanks, range boilers and similar purposes.

The REID-AVERY COMPANY

DUNDALK, BALTIMORE 22, MARYLAND

RACO SHIELDED ARC ELECTRODES

We are accepting orders for deferred delivery on:

RACO TYPE H-D No. 5 for deep groove welding in flat position AC or DC

RACO TYPE H-D No. 6 for fillets flat and positioned machine and plate construction AC or DC

RACO TYPE H-D No. 7 for all position, general construction—shipbuilding DC Reverse Polarity

RACO TYPE H-D No. 8 for all position, general purpose, single pass, building up wearing surfaces, low carbon. DC Straight Polarity or AC

Samples and Literature on Request

ask for this 7-MINUTE STORY

ABOUT A NATIONAL TOOL-ENGINEERING SERVICE

Here's the brief factual report of how the **HECKER** organization designs and builds production tools for many industries—both large and small.

Perhaps it suggests a solution to some of *your* tooling problems. If there's the slightest possibility of your needing outside specialized service on production tooling—make a request for your copy of this **HECKER** booklet to the nearest A. W. Hecker office (addresses below)—mention Dept. H.

A·W· Hecker

DESIGNERS AND BUILDERS OF TOOLS, JIGS AND FIXTURES—FABRICATORS OF AIRCRAFT PARTS

CLEVELAND, OHIO	NEW YORK, N. Y.	BUFFALO, N. Y.	DETROIT, MICH.	CHICAGO, ILL.	LOS ANGELES, CALIF.
1976 East 66th St.	1775 Broadway	443 Delaware Ave.	517 New Center Bldg.	332 So. Michigan Ave.	3723A Wilshire Blvd.

IMPORTANT *Parts of War* READY FOR ACTION

● *Built by*
THE RELIANCE ELEC. & ENG'G CO.

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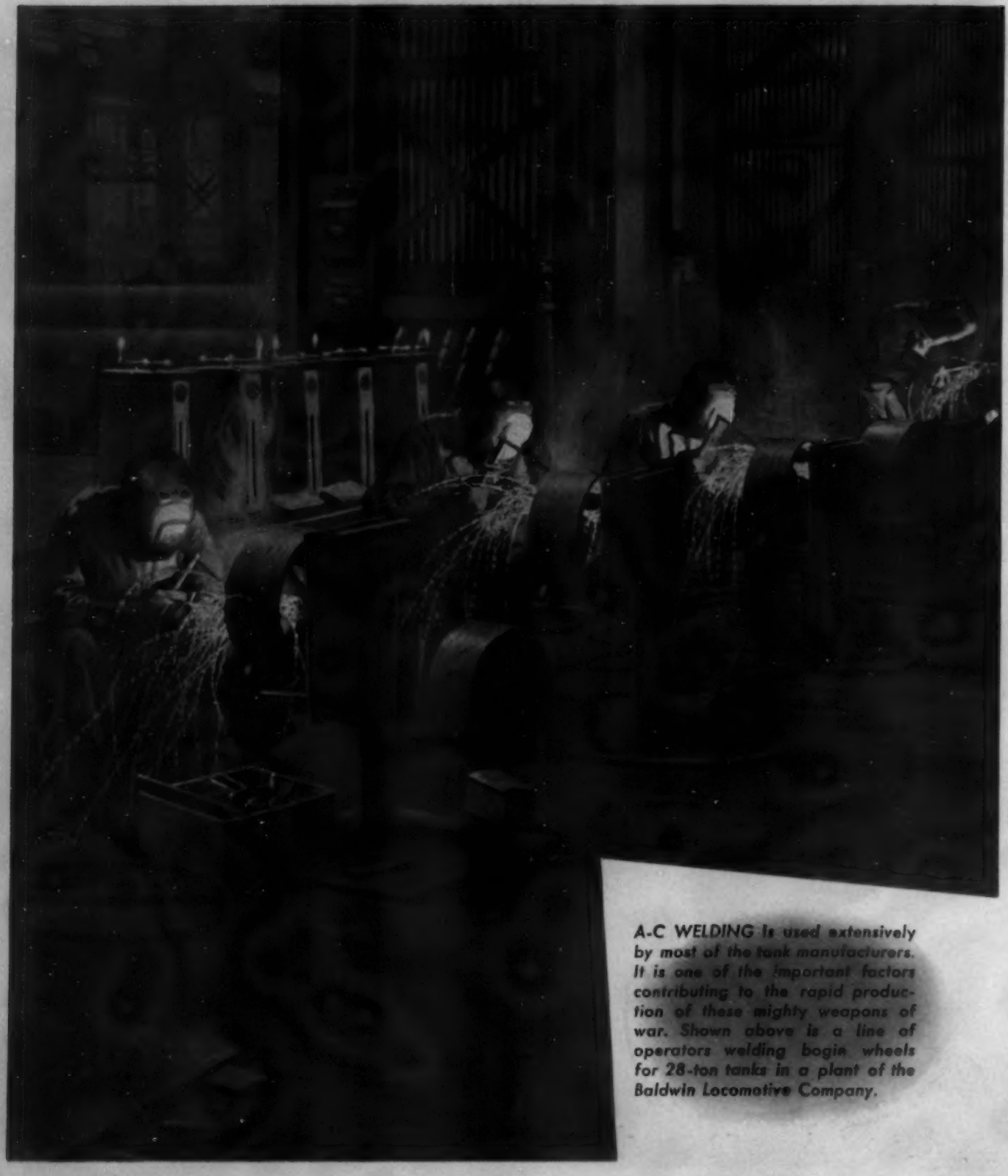

A-C WELDING is used extensively by most of the tank manufacturers. It is one of the important factors contributing to the rapid production of these mighty weapons of war. Shown above is a line of operators welding bogie wheels for 28-ton tanks in a plant of the Baldwin Locomotive Company.

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1 Up to 36% faster welding—In many cases higher currents and larger electrodes can be used for greater speeds. Many users report speed-ups of 15 to 36 per cent after changing from d-c to General Electric a-c welders.

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3 less distribution copper required—A-c welders can use the same power circuits as d-c welders. Or, when new lines are being put in, a-c welders require considerably *less* copper than d-c welders. In addition, they save up to 50 per cent in power because of their higher efficiency.

LARGE SELECTION OF A-C ELECTRODES—General Electric furnishes nine heavily coated electrodes for a-c welding, including the popular W-26 for first-class welding in *all* positions, including vertical and overhead.

FOR COMPLETE INFORMATION on how a-c welding can speed up your production and ensure higher quality work, get in touch with your G-E arc-welding distributor, local G-E office, or write to General Electric Company, Schenectady, New York.

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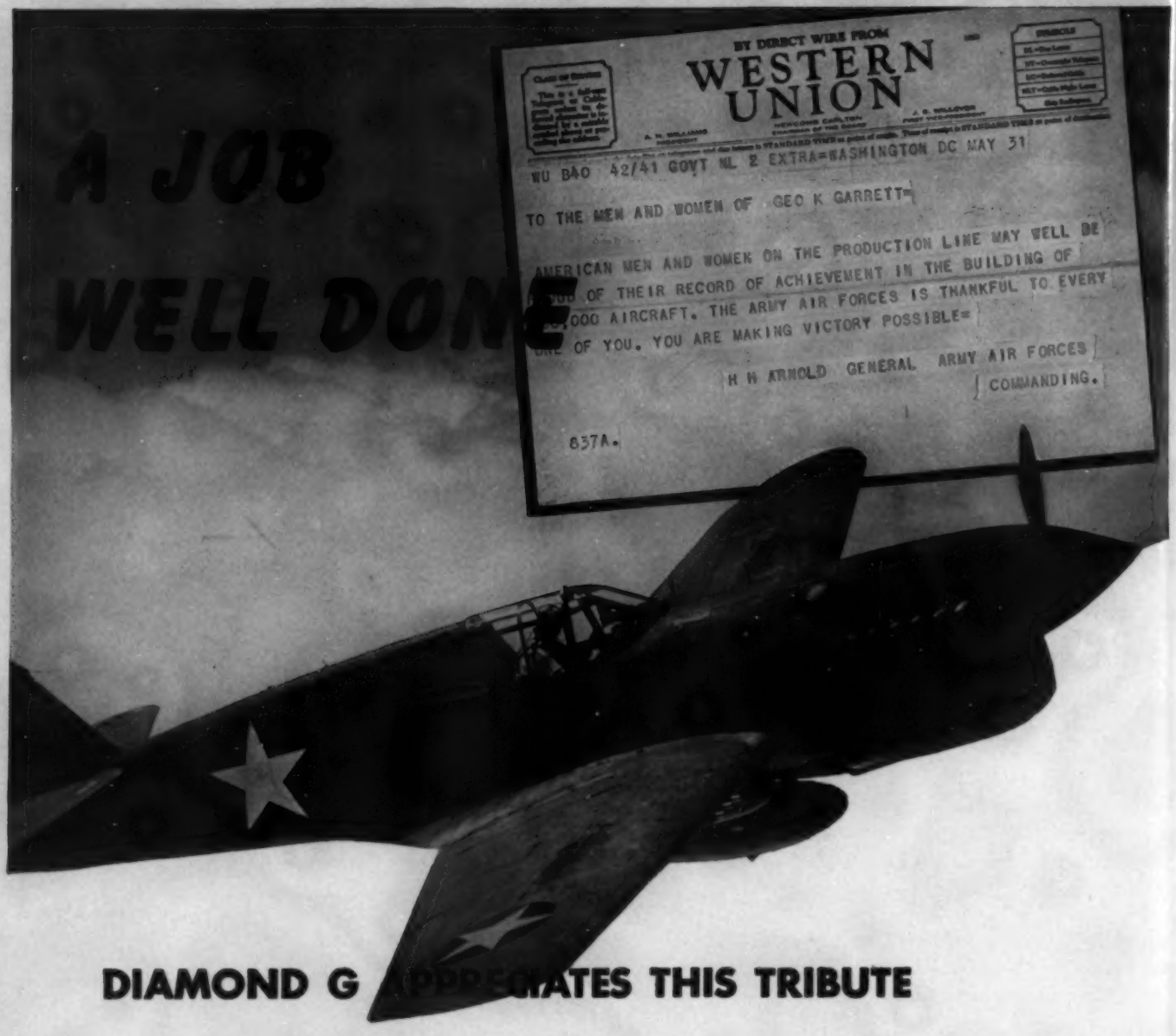
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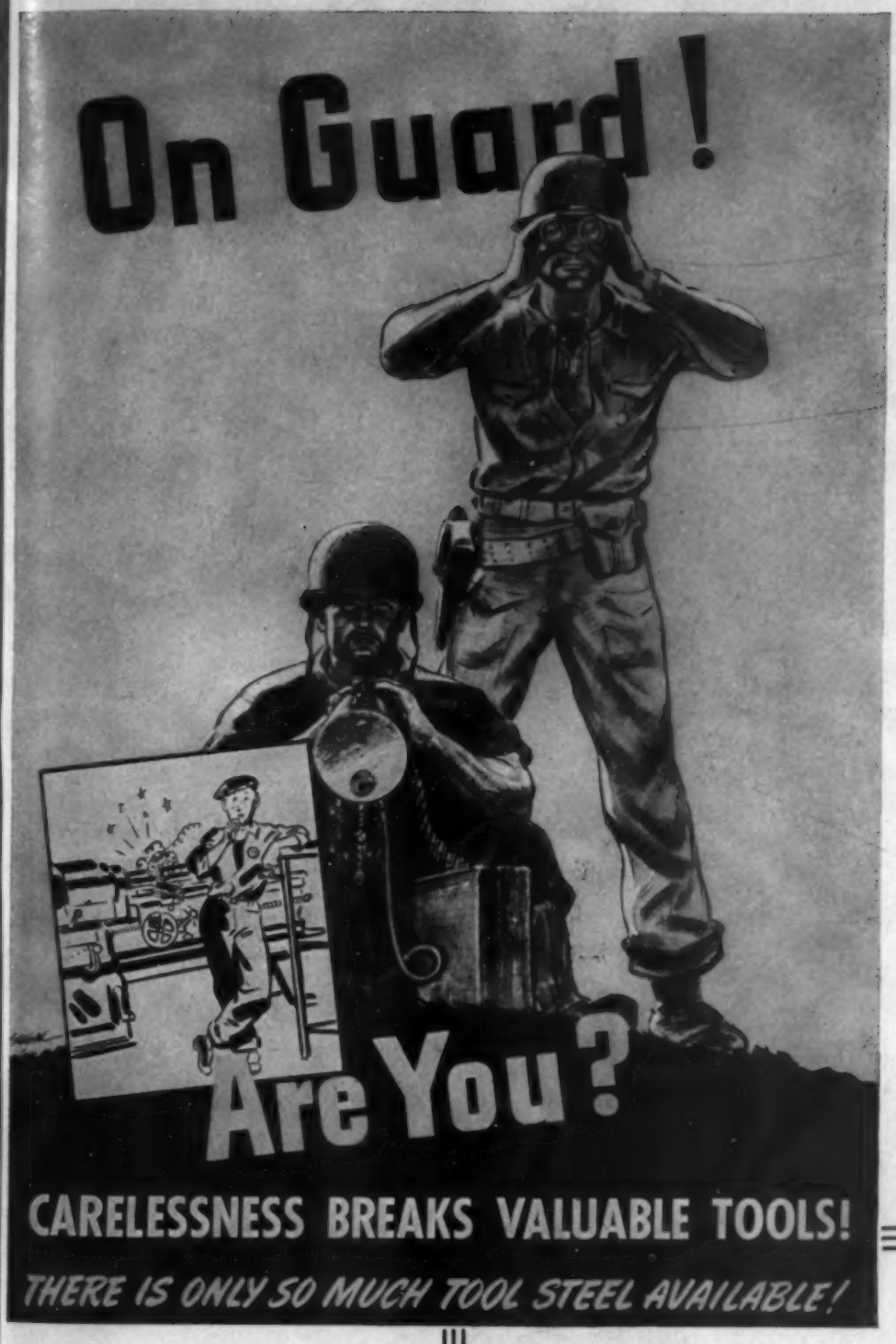

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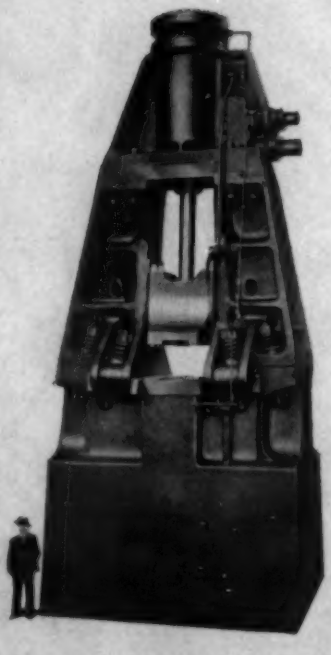
In the thousands of forge shops of the United States and her allies, the Hammers of War are beating out the forgings that will finally become integral parts of the overwhelming might of the Allied forces. Rifles, anti-aircraft and machine guns, all types of artillery, in fact all weapons are either wholly or largely forgings. Engine parts, transmissions, axles, tank treads, pins and other critical parts in combat vehicles, as in the modern truck and automobile, are forgings. Battleships, cruisers, destroyers, submarines are studded with forgings. And the combat plane, from propeller hub to tail controls is a mass of fine forgings.



This is the lesson the War has taught us—a lesson that must carry over into the trying days of the Peace that will follow V-Day—the lesson that there can be no substitute for the strength, light weight and toughness of the drop forging and its ability to withstand "unpredictable" stresses, strains and shocks.

Victory is truly being HAMMERED out—and in a great measure on Chambersburg Hammers.

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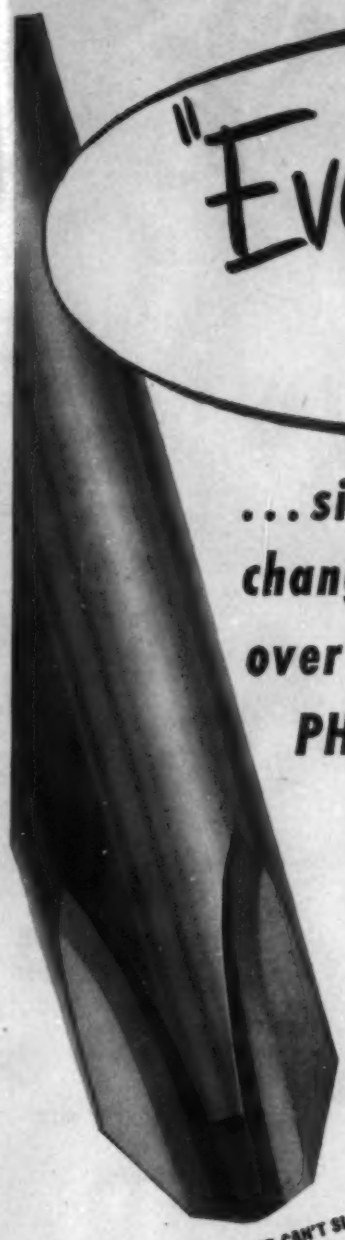

4-WINGED DRIVER CAN'T SLIP OUT OF PHILLIPS TAPERED RECESS

IT amounts to rejecting rejection-tags, when you change from slotted screws to American Phillips. For the Phillips Recessed Head automatically aligns with the Phillips bit, forming one straight driving unit which always delivers these 3 operating advantages:

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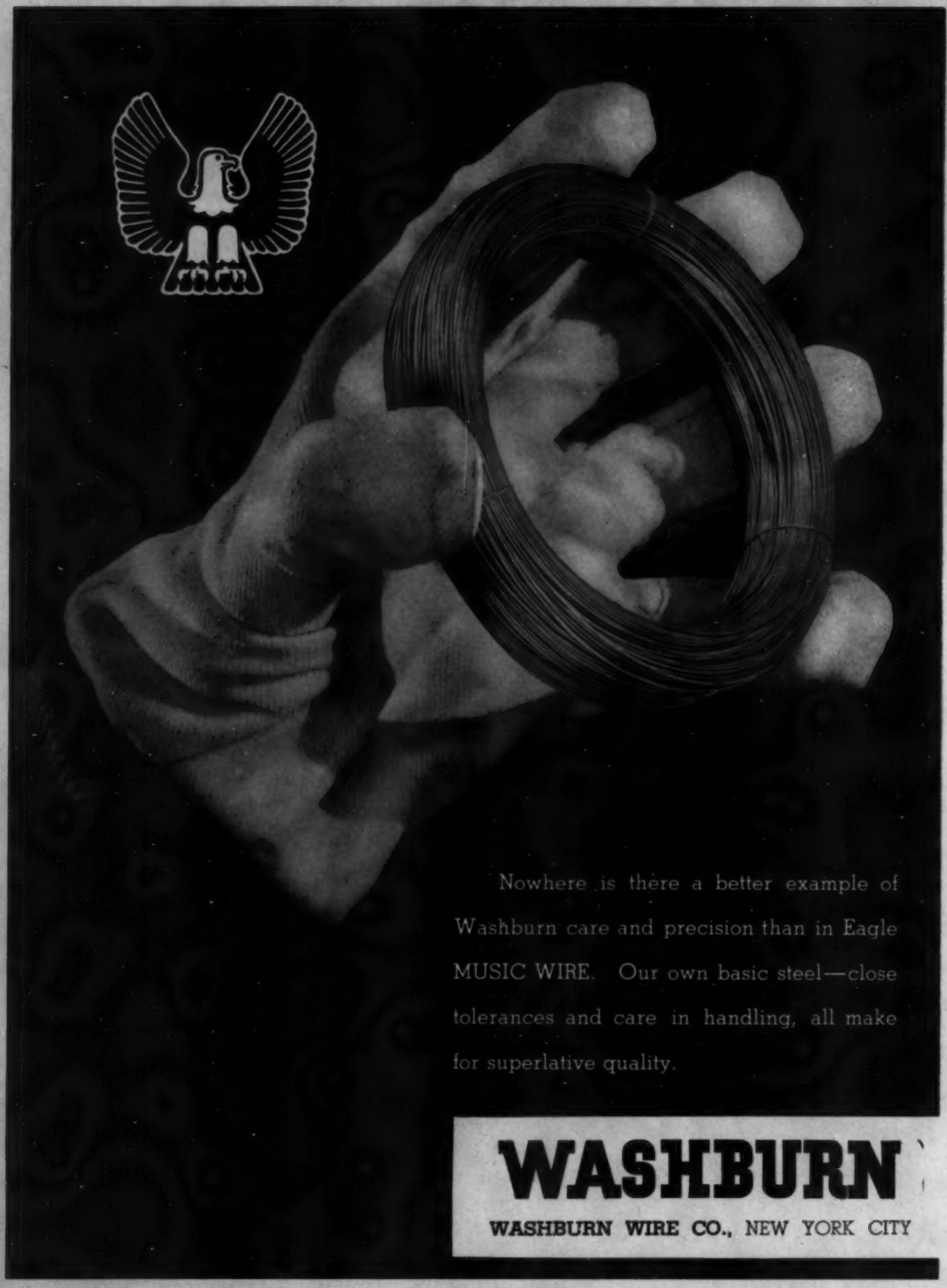
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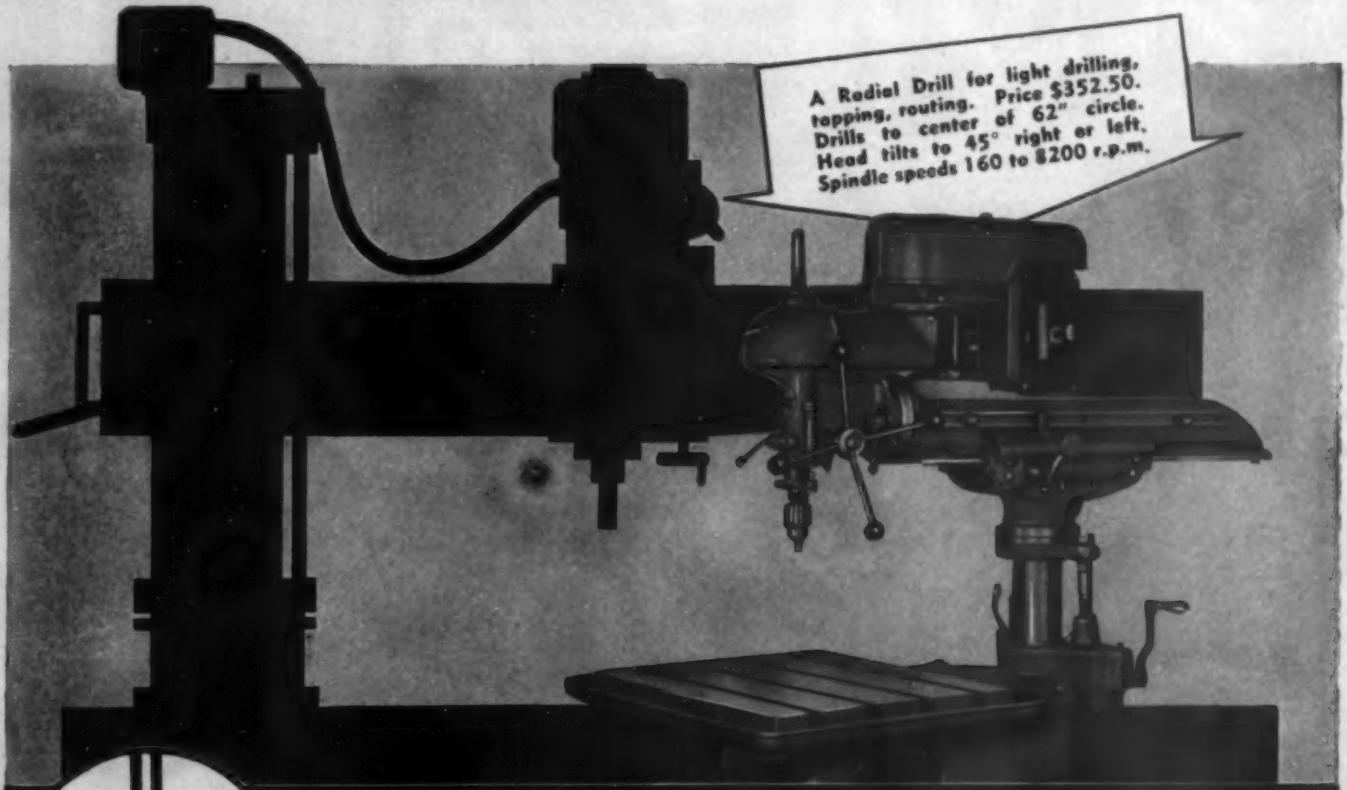
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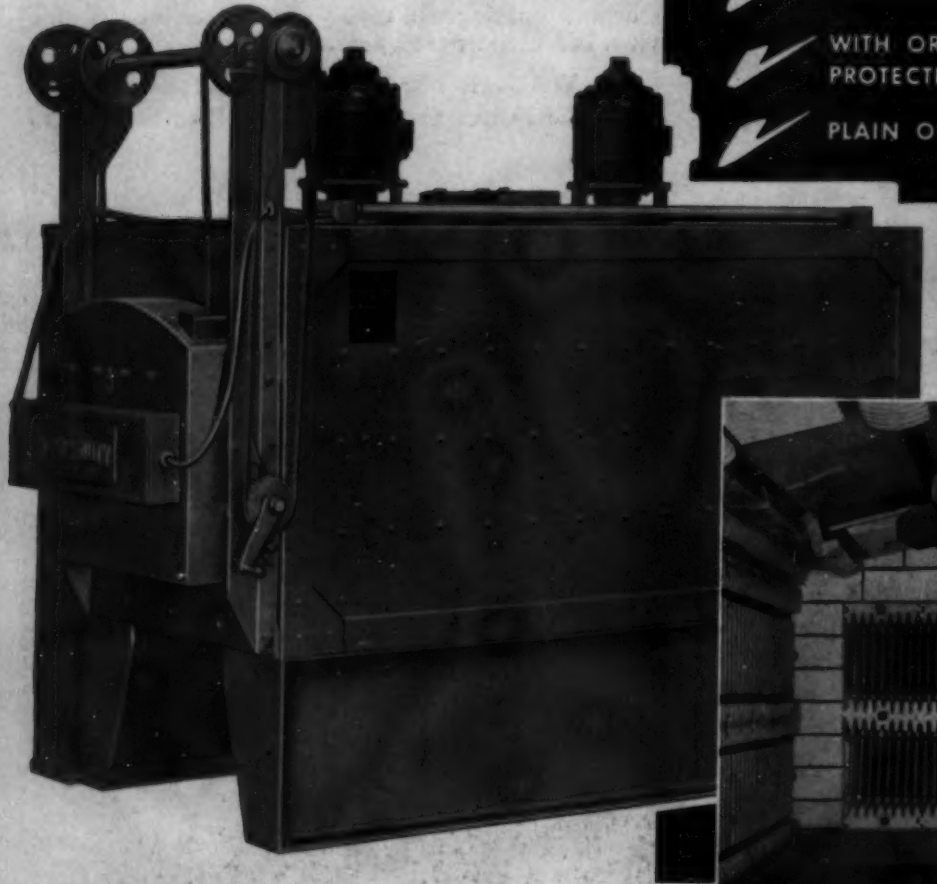
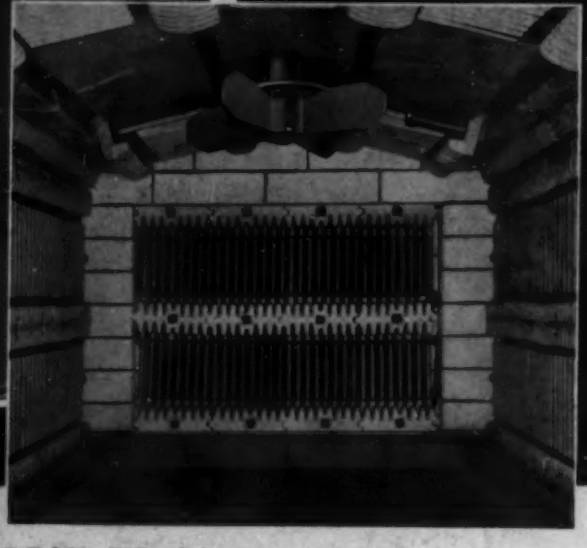


Below: Interior view of a Multi Range Convection Furnace.



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In this friendly, informal atmosphere, things get done faster and better . . . which is the reason we have been on the best of terms, for scores of years, with many of the largest users of brass sheet, rod, and wire. If this also happens to be *your* way of doing business—then we'll be glad to meet you, neighbor, and see what we can do to help you on your post-war plans.

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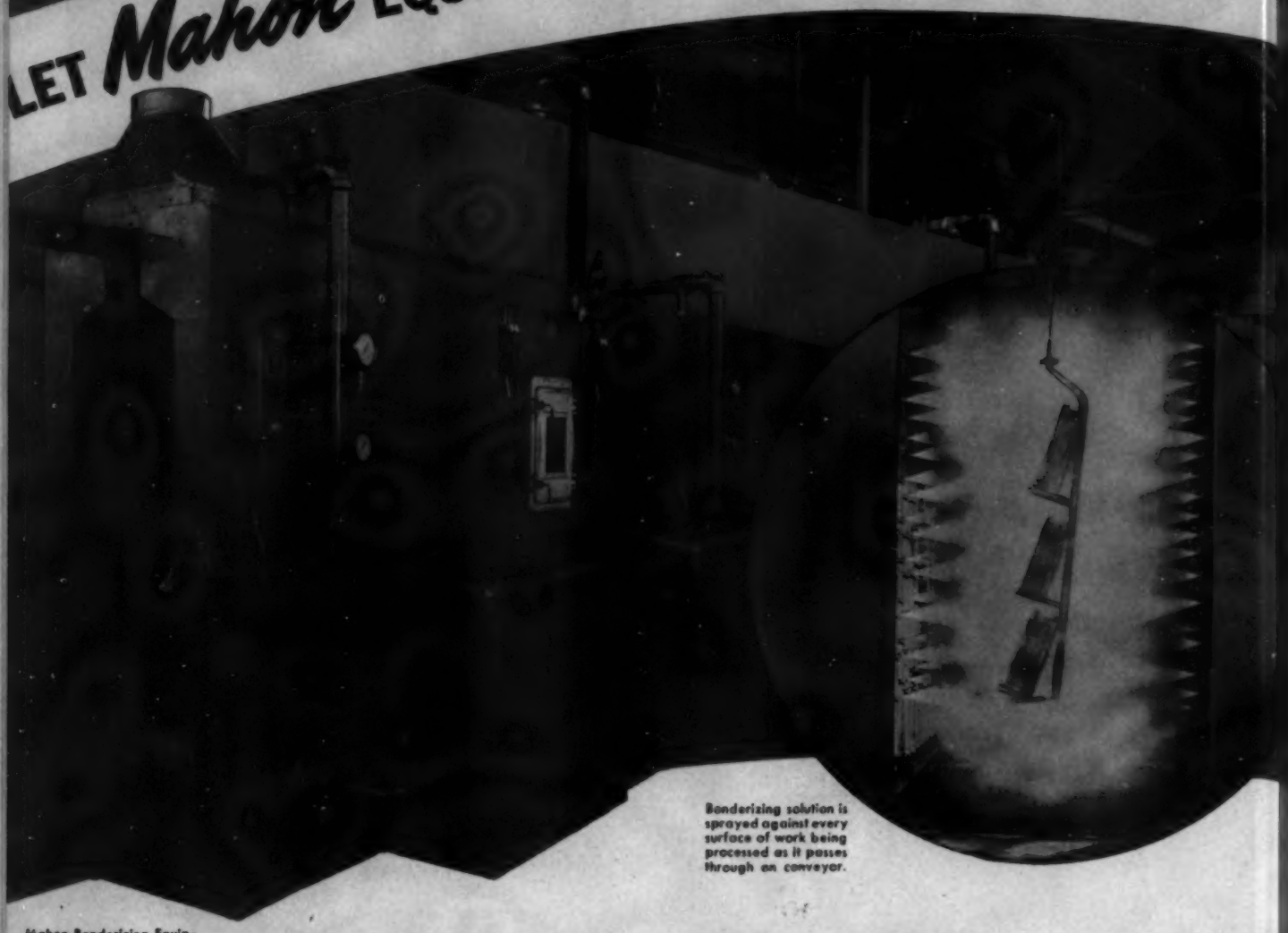
LET *Mahon* EQUIP YOUR PLANT FOR BONDERIZIN



Bonderizing solution is sprayed against every surface of work being processed as it passes through on conveyor.

Mahon Bonderizing Equipment is built to fit your plant and product. All details of installation—type of conveyor — heating — controls, etc. — are given individual consideration.

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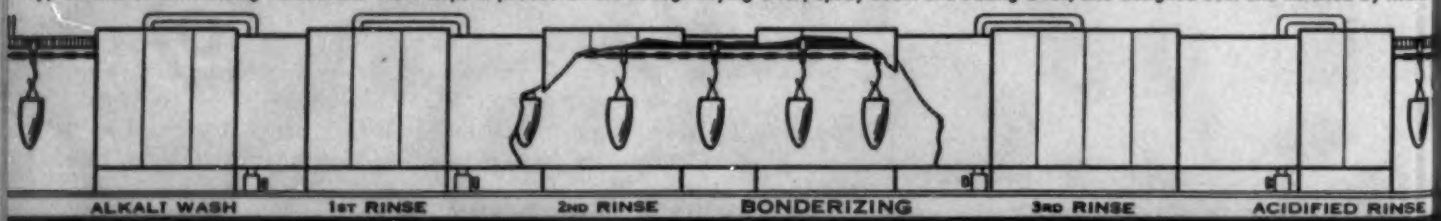

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STEEL

The Magazine of Metalworking and Metalproducing

AUGUST 2, 1943

Volume 113 *Number 5*

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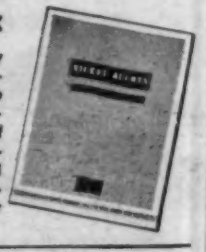

* *Nickel* *

THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall St., New York 5, N. Y.

STEEL
August 2, 1943

Fronts Are Identical, But . . .

In recent weeks deterioration in the administration of internal affairs in this country has assumed alarming proportions. In the East small employers have been forced to absorb the withholding tax of their employes. In some industrial sections it is charged that employers are maintaining workers in semi-idleness to insure an adequate personnel in the pinches to come. Black markets thrive. The threat of inflation is mounting.

With this disconcerting situation in mind, the American public—when first informed that the President would deliver another fireside talk—hoped that he would deal with these internal threats. In the meantime things began to happen in Europe. The Allies made better-than-expected progress in Sicily. Mussolini resigned. Europe seethed.

So, when the President spoke last Wednesday, he dealt primarily with the war. Probably the principal mission of his address was to clarify the terms of peace with Italy. His address was a studied forerunner of General Eisenhower's definite proposal on Thursday.

However, not every word the President uttered was beamed to Italy or the continent. He had a message for the people at home. He emphasized the fact that one cannot make a distinction between the battle front and the home front. The two are identical. The work which makes the soldier, sailor or marine effective in the battle zone begins at home. On the strength of this reasoning he appealed for more effective effort in the shop, farm and office. As if to acknowledge the fact that there is an internal problem, he said he would deal with it in another talk in a few weeks.

When he speaks on domestic affairs, we hope he will realize that the administration of civilian affairs has a direct bearing upon the outcome of the war. Wednesday night he gave the impression that everybody ought to put up with a few inconveniences if in doing so the war effort progressed more smoothly. Everybody agrees to that. It isn't a matter of convenience or inconvenience. It is a matter of dispatch in winning the war.

Confusion in rationing, price control, manpower allocation, financing, renegotiation of contracts, labor relations, etc., is definitely impairing the war effort. It is sapping the nation's strength at the very time when we should be preparing to deliver the knockout punch to the enemy.

We can do better than we are doing providing that we can organize our civilian effort as effectively as we have organized our war effort. This calls for a drastic reshuffling of authority at Washington. We hope the President has the answer in his publicly announced new approach to the problem.

DOCTOR UNCLE SAM: Every employe and employer should be vitally interested in the bill sponsored by Senators Wagner and Murray for broadening the scope of present social security legislation.

One of the features of the bill is provision for a government-operated medical setup. It is proposed that the surgeon general arrange for the general medical, special medical, laboratory and hospital services for the 110,000,000 individuals who would be covered by the broadened federal social security program.

The surgeon general's medical setup alone would require $3,000,000,000 annually. The entire proposed program would increase payments by employer and employe up to 6 per cent on wages up to $3000 per year.

Many citizens who see virtue in a practical degree

(OVER)

of social security will balk at federalizing medical and hospital services. This bill may come close to thrusting the entire issue of private versus federal activity out into the open, where it can be debated thoroughly. —p. 69

• • •

FIRST IN 50 YEARS? In announcing its suit to invalidate two Steckel mill patents, the Justice Department refers to it as the "first important proceeding of its kind in 50 years." It cites as a comparable case the government's unsuccessful attempt in 1893 to set aside patents of the American Bell Telephone Co. on the charge that the procedure of the Patent Office had been abused in order to delay the issuing of the patents.

Apparently the point of similarity in the Steckel and American Bell suits is the charge of abuse of patent procedure. However, unmentioned by the Justice Department, were a number of important cases about 25 years ago which also hinged upon abuse of patent procedure.

The patent contract stipulates that an investor reveal all of the essential facts regarding his invention. During World War I the government took over enemy-owned patents and licensed American manufacturers to use them. In many instances, the licensees discovered that the original patentees had withheld essential information. Since this failure to make full disclosure violated the patent contract, the patents were declared void.

The crux of the Steckel suit lies in the government's claim that the patents were obtained by "fraud and collusion." While this is a charge of abuse of patent procedure, it differs sharply from the claims involved in the American Bell and enemy-owned patent cases. —p. 66

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VERSATILE FABRICATORS: Changing demands of the war program have imposed difficult problems upon the structural steel fabricating industry. Early in the war effort structural mills and fabricating shops were busy rolling and fabricating structural steel for new war plants. This job has been largely completed and now the industry is trying to adapt itself to other war work.

The rolling of wide-flanged beams and heavy shapes has almost ceased. Most structural mills are rolling lighter shapes. Fabricating shops are turning more and more to subassemblies for ships and to other work quite different from the accustomed fabrication of buildings and bridges.

This shift has involved radical changes in operations. Many shops which normally were handling shapes almost exclusively now find that 90 per cent of the material handled consists of plates and sheets. More welding is done than heretofore. Jigs are used more extensively. Women are beginning to find their way into structural shops.

Here again, as in the machine tool and other industries, the challenge of war has been met with a degree of ingenuity and adaptability which even the steel construction men themselves did not know they possessed. Some of this war-born versatility will pay postwar dividends. —p. 59

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JOBS AFTER THE WAR: U. S. Bureau of Labor Statistics estimates that 14,500,000 demobilized servicemen and released war workers will be seeking peacetime employment at the end of the war. According to its investigation, the problem of absorbing these individuals into jobs will be most severe in Michigan, Connecticut, Washington and Indiana.

Much will depend upon the manner in which demobilized servicemen and released workers are absorbed in the various geographical districts. Success in some localities and failure in others might cause violent shifts in population. This should be a good incentive for local postwar planning. —p. 90

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MORE STEEL IN SIGHT: Government officials and industrial leaders are a bit more optimistic over the prospect of obtaining 2,000,000 more tons of steel during the remainder of the year. They are encouraged by the increase to 650,000 tons in the volume of orders reduced or canceled in the "Share the Steel" campaign.

They also are heartened by the progress made in getting new facilities into operation ahead of schedule. Also gratifying is the return to near-normal production in the coal mines.

These favorable developments do not mean that the 2,000,000 tons are "in the bag." There are many obstacles yet to be overcome.

The "Steel for Victory" drive still needs all the support it can get. —p. 62

E. L. Shaner

EDITOR-IN-CHIEF

High strength and workability of Inland Hi-Steel are of great advantage in building heavy field gun and howitzer carriages.

Built Light and Tough with Inland Hi-Steel

Carriages for America's large field guns must be built to withstand terrific impact and torsion stresses—be as light as possible—and, because of the urgency for equipment of this kind, must be made of steel that is easily fabricated and retains its strength under relentless pounding. Inland Hi-Steel—the low-alloy, high-strength, corrosion-resistant, structural steel—meets these requirements.

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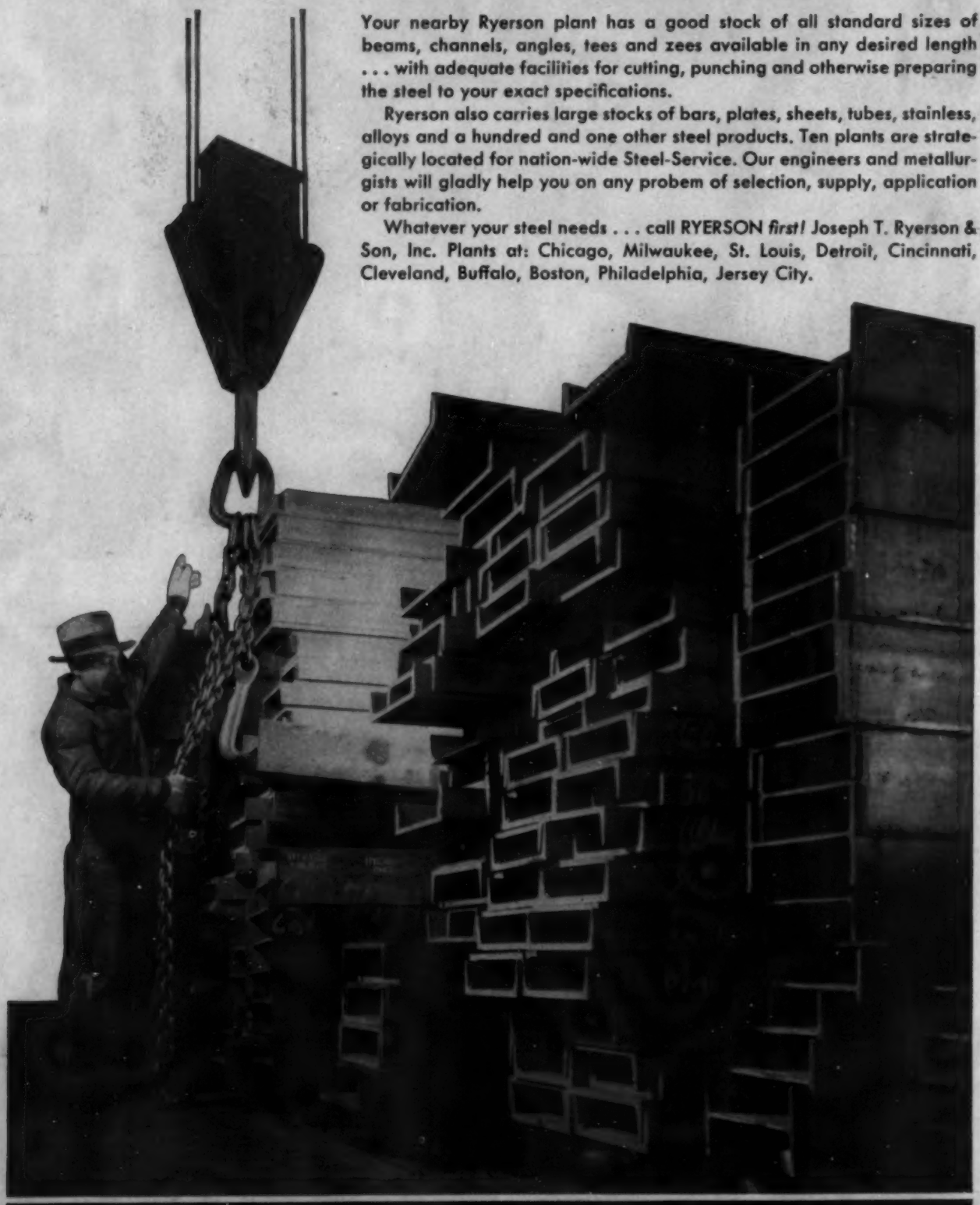

RYERSON STEEL-SERVICE

SHIP WORK AIDS FABRICATORS

New war plant construction completed, industry turns to materiel production. . . Far-reaching changes in operations, methods and materials required result. . . Work delayed by hostilities contributing to potential postwar demand

By L. E. BROWNE
Associate Editor, STEEL

NEW YORK

STRUCTURAL steel fabricating industry, one of the first to complete its initial wartime assignment of building the tremendous industrial plant for the arsenal of democracy, now is contributing largely to shipbuilding and other war materiel production.

Ship work is being taken on in increasing volume and much credit for the record output of vessels is due the fabricating shops. Complicated subassemblies are being fabricated by men who never sniffed salt water, for inland shops are heavily engaged as well as those located on the coasts.

With this shift in the type of work fabricated has come far-reaching changes in operations, methods and the nature of material required. Shops normally fabricating shapes exclusively now take 90 per cent of their tonnage in plates and heavy sheets. Shapes needed are mostly lighter sections, channels and angles.

With riveting equipment idle, welding capacity is taxed and women are appearing in structural shops as welders.

An increasing tonnage is fabricated on jigs, many complicated, but reducing fit-up and layout time. With new materials and methods of fabrication many structural shop interiors are hardly recognizable as such. All this has been accomplished with a minimum of new equipment, the increase in welding capacity being most notable.

This emphasis on shipbuilding and the lack of demand for steel for bridges, buildings and other normal outlets has also great effect on structural rolling mills. Rolling of wide-flanged beams and heavier sections has practically halted. More pieces per ton are required for fabricating and the average tonnage of metal requires more fabrication. Ship tonnage is confined largely to 23 sizes of shapes, five bulb angles, 12 angles and five ship channels. On these sizes rollings are largely limited.

Some individual mills are operating full on ship sizes; one rolling junior beams, 3/16-inch in thickness, 6 to 12 inch size, is exclusively on ship tonnage; the beams are slit to make two tees used largely in bulkheads. The largest consumer of this mill at the moment is a shipbuilding competitor.

Positioning of work for downhand welding justifies advantages gained in many current structural fabricating shop operations. Size and shape of subassemblies are planned and arranged so work can be turned over to assist welding operations. Jigs are designed as a container for the above work and no stress is imposed on the partially assembled units as its position is reversed

Tonnage from structural mills this year will be more than 1,000,000 tons below 1942. An estimated 3,600,000 tons will be rolled against 4,938,000 tons last year which was 8 per cent over the 1941 peak. Currently operating at about 65 per cent of capacity, around 85 per cent of the output is going to ships, direct to yards or to subcontractors.

Inventories of shapes for the most part are in better balance and for the time there is less pressure for material.

Much of the 3,600,000 tons expected to be rolled this year will bypass structural fabricating shops. Fabricators booked approximately 325,000 tons during the first half, which if maintained would indicate a 650,000-ton year for members of the American Institute of Steel Construction. Shipments are estimated at 590,000 tons in the first six months of a 1,180,000-ton year; the latter estimate is probably too large however, for shipments have been on the decline since March. Both estimates also include some tonnage required for the high octane gasoline and synthetic rubber programs, which are more evident in the shipment figures than bookings. Structural steel required for the first phase of the high octane approximated 34,500 tons. Supplemental programs for both gasoline and rubber are under consideration.

The radical changes affecting both fabricating shops and mills are revealed by bookings and shipments in the two

years before 1943 when the demands for steel for the war industrial plant were at peak. Actually a substantial part of the plant was completed in 1941. In 1942 bookings totaled 1,762,453 tons and shipments 2,039,966 tons; 1941, bookings 2,296,954 tons, shipments 2,251,089 tons; thus 1941 was the peak year since 1929.

Sharp decline in demand which started in May-June, 1942, has continued. By April, this year, backlogs of many fabricators were exhausted. New inquiry was confined to supplemental requirements developing as the war progressed and the same situation continues. This situation made it imperative that fabricators seek contracts in other directions; shipbuilding was the most logical.

Some fabricators were quick to make the change, but on the whole there was a lag; some shipbuilders were slow to sublet heavily and some fabricators were reluctant to embark on new seas. Gradually subcontracting gained momentum and now numerous shops are but adjuncts to the shipbuilding industry. Some of the larger structural units are building ships and barges as prime contractors, having built new yards for the work. One spent $9,000,000 on a new yard.

The mechanics of estimating, engi- purchases of fabricated portable bridges details have undergone changes as have shop operations. Compared with engineering costs and details involved in the high octane gasoline expansions, such problems for shipbuilding are relatively simple for estimators. Engineering costs as high as $20 a ton entered quotations on some gasoline plant extensions. One set of plans covering an assembly for one ship is frequently enough for the entire group. Nevertheless, frequent changes in deck equipment, loading details and new sections operate against a static situation in ship construction, providing new work and details for fabricators. An outstanding example is the construction of a secondary deck on tankers enabling that type of ship to carry a cargo of aircraft.

There are wide spreads in prices quoted for structural steel fabrication; prices are well above lean year levels, reflecting higher costs. Small construction projects, 75 to 100 tons, while few in number, frequently go at 6½ to 7 cents a pound, fabricated and erected. Range of quotations on some of the high octane gasoline construction has been as great as $50 a ton. In quoting on ship subassemblies shops are frequently bidding on a payroll dollar basis, the Maritime Commission furnishing the material.

The war has demonstrated the flexibility of the industry and changing demands have been met with existing peacetime facilities and equipment for the most part. The industry is frequently classed as one with over-capacity in normal times. At the peak demand it never reached 100 per cent operations, although this was due in part to limitations on available plain material. Currently, from a standpoint of tonnage, the industry is not operating much better than 50 per cent, ship work included, but because of the nature of operations and demand estimates as to capacity and operations mean little. Compared with normal years, based on fabrication of shapes, tonnage in 1943 will be below the drab year of 1932. Yet shop operations will be much higher as will rolling mill output. Bookings in June, the last available, were the heaviest of the year, approximately 100,000 tons. Barge contracts accounted for this. Shipments for the month were lower.

Restrictions on steel in building and engineering construction continue tight. Nothing is authorized or approved by WPB unless its importance to the war program makes it imperative; stop orders are halting some construction. This precludes any improvement in normal demand for the duration; directive quotas aim at the constructive conservation of every ton of building steel for more necessary requirements.

Structural fabricating shops are engaged on more complicated assemblies than ever before requiring greater use of well planned jigs. When assembly of many component parts and a number of identical units are required, jig planning and assembling is frequently far more elaborate than on usual structural fabricated work. Cost of jigs is justified by savings in layout, fit-up time and labor

Bridge Tonnage at Standstill

Bridge tonnage is at standstill, both highway and railroad, but substantial purchase of fabricated portable bridges for field service are being placed by the War Department. Stepping up of activity at the war fronts is stimulating requirements; these units are fabricated largely by welding.

The size of ship subassemblies fabricated at some of the larger plants tends to increase; in some cases the size of the assembly has about reached the limit for trucking and railroad transportation to shipyards. While shipbuilding offers the most work for structural shop fabrication, subcontracts on gun carriages, shell blanks, barges and other miscellaneous war products are on schedules; one eastern shop is making turnbuckles of bars and nuts by welding. Tanks are also fabricated. Welding departments in some instances are operating round the clock.

In view of the 4,000,000 tons of structural steel erected in two years, prospects for the postwar period at first glance would appear to be dim. However, the bulk of this volume went into industrial plant expansion and normal demand in other directions has not been met. This demand is cumulative and is backing up a potentially large tonnage. Bridges well illustrate this point; bridge building has been restricted and will take a substantial volume after the war. Railroads will need considerable steel for bridges and other structures.

A recent survey indicated 704 spans in New Jersey are too narrow and 717 have inadequate carrying capacity. Of 2272 bridges surveyed the state highway planning bureau found 717 unable to carry safely a 10-ton loading and rec-

ommends replacement with new bridges capable of carrying 20-ton loads.

Extensions to plants producing consumer goods have been few and with a heavy demand backing up for these goods, to be released after the war, more steel will be required for structures of this type. The power capacity of the nation will be stepped up 500,000 kilowatts for 1945 operation and because of long fabrication and construction cycle involved in power plant construction, work must begin soon for completion in 1944 or early 1945. Seven specific projects have been given the right of way. Five of these will be steam plants.

While the postwar period augurs no great boom for the structural steel fabricating industry, the demand will probably be greater than superficial consideration of the prospects would indicate. It will be bolstered by large public works programs plans for which will be ready at the close of the war. New York city has a program taking more than 600,000 tons of structural steel, for subway extensions notably, while New York state has one almost as large. Public works with an increase in demand for work held up by the war will go far toward a return to normal tonnage years. However, there will be an abundance of surplus capacity in the fabricating end of the industry, also with mills, and the competition should be intense.

Present, Past and Pending

■ CIVILIAN BUSINESS MAY DROP A FIFTH IN FINAL HALF

WASHINGTON—Arthur D. Whiteside, WPB vice chairman, has notified congressmen that he expects a 20 per cent reduction in dollar volume of civilian business for the last six months of this year, compared with sales for the same period of 1942.

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■ STEEL PRODUCERS GET NEW MONTHLY REPORT FORM

WASHINGTON—Steel Division, War Production Board, has made up a new CMP form for steel producers' reports of monthly shipments and past due orders. The new form, WP-2633, supersedes CMP-8. It provides for 39 new categories of class B products and several further subdivisions of claimant agency programs, and separate reporting in several instances on maintenance, repairs and operating supplies.

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■ STEEL MILLS MAY ROLL 12,500 TONS OF BRASS STRIP

NEW YORK—Because of labor shortages in brass mills, the rolling of approximately 12,500 tons of brass strip on steel mill capacity is under consideration.

• • •

■ F. B. HYDER HEADS UP IRON ORE SECTION OF WPB

WASHINGTON—F. B. Hyder, consulting engineer, Los Angeles, has been appointed head of the Iron Ore Section, War Production Board. He succeeds S. O. Hobart, of Pottstown, Pa., resigned.

• • •

■ AT CROSSROADS IN INFLATION BATTLE, SAYS WLB

WASHINGTON—The War Labor Board warns the nation is at "a historic crossroad" in the battle against inflation. The statement was made in a decision denying a pay raise to 8500 employes of Bendix Corp., South Bend, Ind.

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■ WMC COMPILING SUPER-CRITICAL OCCUPATION LIST

WASHINGTON—War Manpower Commissioner McNutt discloses his commission is preparing a super-critical list of occupations to receive preferential treatment in administering the draft law. It is intended to supplement the present classification of essential jobs and assist the work of local draft boards.

• • •

■ GOVERNMENT TO CONTROL TENTH OF STEEL CAPACITY

WASHINGTON—Jesse Jones, Reserve Finance Corp. chairman, states after the war the government will own about 10 per cent of the nation's total steel capacity, 92 per cent of magnesium capacity, and over half of the aluminum capacity.

• • •

■ U. S. SHIPYARDS MAY DOUBLE 1942 OUTPUT THIS YEAR

NEW YORK—J. Lewis Luckenbach, president, American Bureau of Shipping, reports last year's total of ships built will be considerably more than doubled in 1943 if American shipyards maintain their present rate of production.

• • •

■ MACHINE-TOOL MAKERS MAY DISCUSS ITALY

WASHINGTON—When representatives of machine tool manufacturers meet with the War Production Board this week, one subject of discussion possibly may be machine tool requirements of Italian industrial firms. Such a program probably would be handled on a lend-lease basis.

Labor Supply Situation Tightens Further

Changes by the War Manpower Commission in labor market area classifications, effective Aug. 1, indicate further tightening in the labor situation. The following cities have been advanced from Group II to Group I which consists of areas of acute labor shortages:

Anderson, Ind.; Everett, Wash.; Los Angeles, Calif.; New Bedford, Mass.; Oklahoma City, Okla.; Racine, Wis.; and Spokane, Wash. Classified and added to the list for the first time are the following in Group I: Butte, Mont.; Eureka, Calif.; Territory of Hawaii.

Dayton-Springfield, O., has been transferred from Group I to Group II which consists of areas of labor stringency or in which a labor shortage may be anticipated after six months. The following areas have been advanced from Group III to Group II: Atlanta, Ga.; Augusta, Ga.; Bakersfield, Calif.; Columbus, Ga.; Fresno, Calif.; Mansfield, O.; Muncie, Ind.; Pontiac, Mich.; Richmond-Petersburg, Va.; and Youngstown-Warren-Sharon, Ohio-Pa.

Areas in Group II

The following areas have been classified and added to the list for the first time, being placed in Group II: Amsterdam-Gloversville, N. Y.; Boise, Idaho; Brawler-El Centro, Calif.; Clinton, Iowa; Kenosha, Wis.; Lake Charles, La.; Longview-Kelso, Wash.; Middletown, Conn.; Modesto, Calif.

Duluth, Minn.-Superior Wis., and Greenfield, Mass., have been transferred from Group II to Group III, consisting of areas in which a general labor shortage may be anticipated after six months. Abilene, Tex., Galesburg, Ill., and Miami, Fla., have been transferred from Group III to Group IV, consisting of areas in which the labor supply is and will continue to be adequate to meet all known labor requirements. The following have been advanced from Group II to Group III: Birmingham, Ala.; La Crosse, Wis.; Lewiston, Me.; Omaha, Nebr.; Rome, Ga.; San Antonio, Tex.; Taunton, Mass.

Campaign Forges Ahead with Work On New Plant Capacity Pushed

Government officials now expect expansion program to be completed by February. . . . Order cancellations in "Share the Steel" effort total 650,000 tons. . . . Indictment of 30 miners under anti-strike law highlights labor situation

WITH gratifying results reported to date in the "Share the Steel" campaign, the "Steel for Victory" drive is forging ahead and government officials are encouraged to hope that the 2,000,000 additional tons required for the war effort in the last half of the year will be obtained.

Reports available at the War Production Board indicate that up to late last week 650,000 tons of steel on mill order books had been canceled under the "Share the Steel" campaign, and officials are hoping to raise that figure materially.

Of the total amount canceled to date 80 per cent is for third quarter and 20 per cent for fourth quarter. Also, about 80 per cent is carbon steel and 20 per cent alloy steel.

Indications are that the "Share the Steel" campaign will wind up this week with some 15 War Production Board officials now campaigning throughout the country returning to Washington. Reports are current that some 3000 to 4000 consumers have been actively solicited for order cancellations. It is believed there are some 35,000 large consumers in the country.

Further contributions to the success of the "Steel for Victory" drive are being made by completion of new plant facilities ahead of schedule, and by stepping up output from existing facilities through labor-management committees. WPB steel expansion officials profess to be well satisfied with the program as it is going today.

It is now expected that by the first of the year some 2,000,000 tons additional plate capacity will be in production, and it is the hope that if things continue as at present that by February, 1944, the steel expansion program, as now outlined, will be completed.

At the opening of the "Steel for Victory" drive, the WPB set out to push completion of seven steel expansion projects in record time and that plan is being carried out. It now looks as though the electric furnace expansion program will be finished by September, the blast furnace program by November, and the open-hearth furnace program by February of next year.

A report current throughout the country is to the effect that government claimant agencies have asked the War Production Board for 5,000,000 more tons of steel than are available for allotment for fourth quarter. During the third quarter these government agencies asked WPB, under the Controlled Materials Plan, for 6,000,000 tons more than were available.

With the coal strike settled blast furnace operations and steel ingot production have returned to near normal. Several stacks which had been taken out of blast were not returned to operation because it was thought advisable to repair them before returning them to production.

A factor which may hamper attainment of the desired steel production goal is that from now on blast furnace operations may be considerably affected by the need to take out stacks for relining and other repairs. Months of continuous operation are beginning to take toll of blast furnaces in the Great Lakes area. A report issued by the Lake Superior Iron Ore Association disclosed that 21

Steel expansion program moved another step closer to completion as this huge new blast furnace at Carnegie-Illinois Steel Corp.'s Edgar Thomson Works, Braddock, Pa., was blown in recently to give added impetus to the "Steel for Victory" drive. The giant furnace, from which the first molten iron is shown being tapped, will play an important role in the effort to provide 2,000,000 additional tons of steel before the year's end

STEEL UNAFFECTED

Recent developments in Italy have resulted in no cutbacks in steel orders so far as can be learned. What may develop should Italy soon collapse completely is being speculated upon, though trade leaders are inclined to believe that while there may be some shifting in steel requirements, overall volume will continue unchanged — certainly for some time.

While prior to news of the ousting of Mussolini, there were some cancellations of cold-drawn steel bar orders for lend-lease. Some of this tonnage, it is reported, was originally scheduled for Russia, where it has already been rolled, and is being easily converted to other channels as the steel is to American specifications.

stacks—the largest number since May, 1941—now are idle. Others are to be taken out of blast as soon as those now on the inactive list are repaired and placed in commission. With 12 fewer blast furnaces operating in June than in May, June ore consumption declined to 6,939,998 tons. This marked the first time that consumption fell below the 7,000,000-ton mark since February, 1942.

In the first six months this year, however, consumption totaled 44,002,720 tons, an all-time record.

Solid Fuel Administrator Ickes last week said the Bituminous Coal Division estimated production of bituminous for the week ending July 17 at 11,860,000 tons against 11,170,000 tons in the week ended July 10. Prior to the general strike, weekly production of bituminous coal was considerably above the 12,000,000-ton level. In the calendar year to July 17, 313,348,000 tons of bituminous coal were produced. This compares with 312,056,000 tons in the like period of 1942.

Total coke production to date this year is estimated at 38,410,400 tons, against 38,042,500 tons in the like period of last year.

Indict Coal Union Leaders

As an aftermath to the coal mine strike, indictment of 30 insurgent union coal miners in southwestern Pennsylvania by the federal grand jury at Pittsburgh on charges of violating the recently enacted Smith-Connally anti-strike law highlighted developments on the labor front last week.

The indicted miners are charged with having directed strikes and with having otherwise hindered operation of 24 coal mines which were in the possession of the government. All of the defendants are officials or members of local unions of the United Mine Workers of America.

Particular significance attaches to the action since it is the first taken under the Smith-Connally anti-strike law. The indicted men will be tried at a special term of court to be held in September and up to late last week it was uncertain whether the union would "go to bat" in defense of the indicted men.

"Have Not" in Raw Materials

Lacks coal, oil, scrap and nonferrous metals. . . Capitulation would make important munitions factories available on Continent to United Nations. . . Hydroelectric projects well developed

ITALY'S anticipated collapse as an Axis partner will have little effect on the mineral and raw material supplies of either Germany or the United Nations.

The peninsular nation's history has been one of insufficieny in such supplies, a situation that has been intensified by the loss of her briefly-held empire.

As a matter of fact, the United Nations will be faced with the problem of supplying such materials as coal, petroleum, iron and steel, ferroalloys, copper, nickel, tin, magnesium and rubber to maintain output of Italy's industrial machine. Practically the only minerals in which the country is self-sufficient are aluminum, zinc, lead, mercury and sulphur.

Conquest of the mainland, however, probably would make available to the Allies important munitions-producing factories. Output of these may be used to continue prosecution of the war against Germany while conserving vital shipping space.

Stockpiles of battlefield scrap accumulated in Africa may be shipped across the Mediterranean to provide Italian steel mills with a raw material most critically needed. Based on statistics released in 1938, the latest available, Italy's steel ingot and castings production was 2,307,392 metric tons.

Steel plants in the Piombino district are located at Terni, Portoferraio, and Piombino; in Brescia district at Bari, Naples, Bagnoli, Bergamo, Crema, Turin, Dalmine, Trieste, Aosta, and Breno; in the Milan district at Milan and Villadossola, Novara; and in the Genova district at Savona, Villadossola, Piedmont; Novi Liguri, Modena, Genova, Sestre Ponenti, Pra, Imperia, Bolzaneto, Liguria; and San Giovanni, Tuscany.

Over the past few years Hitler has profited enormously by using Italian manpower. As early as 1942, Germany conscripted more than 300,000 Italian workers, approximately 45,000 of these skilled in metalworking and metalproducing.

Due to a lack of coal, Italy has dev l-oped extensively her "white coal" industry. At the end of 1941, Italy had 1171 hydroelectric power plants with installation of 5,307,000 kilowatts, 132 thermoelectric plants with 92,600 kilowatts, and 5 geothermic stations with installations of 70,300 kilowatts. Altogether the power plants total 1358 with 6,290,000 kilowatts.

Italy has helped pioneer development of electric furnace melting and refining in steel in an effort to reduce consumption of coke. More than 750,000 tons of steel were produced in electric furnaces in 1938. Existing progress in making steel from pyrite ash is a major Italian technical contribution to steel metallurgy. Pyrite, abundant in Italy, is an iron sulphur mineral used as raw material for sulphuric acid. After the sulphur is burned, the residue or ash, which contains about 50 per cent iron, is converted into steel.

Mine Ore in Alps

As part of Italy's self sufficiency program, the country has attempted to mine iron ore in the Italian Alps from the virtually inaccessible Cogne mines at an altitude of 8000 feet. This project was first undertaken during World War I. More recently Italy is reported to be using iron-bearing sea sands from part of the Italian coast to help supply the metallurgical industry. Ore deposits are found at Elba, Cogne, and Nurra in northern Sardinia, at Boratti, Fallonic, and Strettoia.

Cheap hydroelectric power has to a great extent aided in replacing the country's coal requirements in its metallurgical industry. Italy's coal resources are meager and of poor quality. A total of 11,914,967 metric tons was imported in 1938, nearly 85 per cent of consumption. Germany agreed to supply the Italians with 1,000,000 tons of coal a month but has not been able to live up to the agreement because of the strain on the rolling stock and the destruction wreaked on German railroads.

Italy's domestic production of iron

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ITALY'S MINERALS, METALS PRODUCTION

	Metric Tons 1935	1936	1937	1938
Iron ore (including manganiferous)	568,754	858,065	1,016,270	1,005,713
Manganese ore	9,127	24,132	32,932	48,292
Iron pyrites	833,402	865,404	914,524	930,312
Zinc ore	144,122	157,152	181,968	200,848
Bauxite	170,064	262,246	586,495	360,837
Coal, anthracite	70,150	79,952	95,060	132,197
Coal and lignite, others	918,958	1,495,617	1,929,066	2,221,261
Sulfur, crude, in pigs	311,950	327,568	339,115	380,345
Mercury, metallic	972	1,473	2,308	2,301
Aluminum (from ore)	13,776	15,874	22,947	25,767
Lead (from ore)	36,175	36,821	39,461	44,031
Pig iron	633,383	761,848	801,181	864,536
Steel ingots and castings	2,212,100	2,025,511	2,098,729	2,307,392

U. S. Steel Corp. Ingot Output Cut By Coal Strike in Second Quarter

Chairman Olds states shift in war demands also figured in decline in finished steel shipments. Corporation's first half 1943 earnings down from like 1942 period. Expansion program being pushed

WORK stoppages at coal mines of United States Steel Corp. subsidiaries resulting in the blowing out or banking of a number of blast furnaces with consequent loss in steel ingot production, as well as some shift in war demand from heavy products to light finished steel items, brought about a decline of 260,000 tons in finished steel shipments in the second quarter compared with the initial three months, Irving S. Olds, chairman, said in a statement accompanying the corporation's second quarter financial report.

Ingot yield in the period shifted from 74 to 70 per cent.

First half net earnings were $31,086,053, he said, while the corporation's ingot capacity of 31,330,700 on July 1 was at a new peak.

Eight open hearths are still to be brought in at Homestead, Pa., and nine at Geneva, Utah, both government financed. Three blast furnaces remain to be completed at Geneva, and one at the Edgar Thomson works, where a new stack was put in blast only recently.

First half 1943 earnings of $31,086,053 were equivalent to $2.12 a common share, compared with $33,866,907, or $2.44 a share, in like 1942 period. Drop in income was occasioned primarily by a $63 million increase in payroll costs during the first half. If results for the first six months 1942 are adjusted to allow for their prorata shares of the provisions for pensions and income taxes actually made in 1942, income for that period would be $44.7 million, or $13.6 million more than recorded in like period this year.

Net profit for the June quarter totaled $15,679,456, compared with $15,406,597 in the initial three months.

Directors declared the regular quarterly dividend of $1.75 per share on preferred, and also $1 on common, payable Sept. 20 to record Aug. 20.

Mr. Olds said it was difficult to estimate exactly what the coal stoppages (there were three) cost the company in production of iron and steel. He pointed out they had to close down certain furnaces, and, morever, had to draw on inventories of iron. Together, the cost amounted to about 272,000 tons, all of which was not instantly reflected in steel production, and probably will not be fully reflected for some time. He estimated the immediate effect on steel ingot production was 72,000 tons. He also pointed to the loss in coal tar byproducts, an important item in the war effort.

The corporation also had to dip into its scrap pile to the extent of 80,000 to 90,000 tons.

Average number of employes in the second quarter rose to a new peak of 344,031, the reported increase of about 4000 being due chiefly to additional shipbuilding workers. The corporation expects all the corporation's electrolytic tinning lines will be in operation by the end of this year.

Bethlehem Steel's First Half Net Is $12,842,902

Net profit of Bethlehem Steel Co. for first half this year amounted to $12,842,902, equal to $3.21 per common share, against $12,211,601, or $3 per share, in like 1942 period.

June quarter net totaled $6,614,210, compared with $6,228,693 in the initial three months and $6,070,913 for the corresponding 1942 quarter.

Directors declared a dividend of $1.50 on common, payable Sept. 1 to record Aug. 9.

Federal tax provisions for the first half totaled $61,610,000, against $49,400,000 in same period a year ago.

Eugene G. Grace, president, stated construction of plant additions in June period amounted to $4,616,000, and estimated that the corporation would spend $8 to $9 million over the remainder of this year on such work.

Republic Steel Reports Net of $6,003,732

Republic Steel Corp., Cleveland, had first half net profit of $6,003,732, equal to 88 cents a common share. For corresponding 1942 period company earned $8,072,121, or $1.24 a share.

June quarter profit amounted to $2,337,175, against $3,666,557 in the initial three months and $3,355,158 in second quarter last year.

Six months taxes were $29,600,000, compared with $35,800,000 in first half of 1942.

Jones & Laughlin Earns $4,810,617 in First Half

First half net income reported by Jones & Laughlin Steel Corp., Pittsburgh, totals $4,810,617, equal to $2.08 a common share. In like 1942 period net profit amounted to $4,930,470, or $2.88 a share.

Profit for the second quarter was $2,411,248, compared with $2,399,369 in the preceding period and $2,438,752 in corresponding period last year.

Tax provisions for the first half this year of $11,500,000, were substantially unchanged from like 1942 period total.

Sheet & Tube Reports Net of $2,257,425

Net profit of Youngstown Sheet & Tube Co., Youngstown, totaled $2,257,425, equal to $1.22 a common share in the three months ended June 30 last. This compares with $2,147,023 earned in the initial quarter this year and $2,291,119, or $1.24 a share, for the corresponding 1942 quarter.

Based on quarterly reports the net profit for the first half amounted to $4,404,448, compared with $4,867,698 in like period a year ago.

Inland Steel Has Second Period Net of $3,011,333

Inland Steel Co., Chicago, reports second quarter net profit of $3,011,333, equal to $1.84. In the initial three months this year the company had net income of $2,796,321, while for the corresponding 1942 quarter profit totaled $2,782,391, or $1.70 a share.

Indicated six months net income amounted to $5,807,654, compared with $5,471,481 in like 1942 period.

Directors declared a dividend of $1 per share, payable Sept. 1 to record Aug. 13.

Wheeling Steel's Profit Totals $2,290,401

Wheeling Steel Corp., Wheeling, W. Va., reports first half net income of $2,290,401, or $2.43 a share, compared with $1,995,648, equal to $1.91 a share, earned in like 1942 period.

Second quarter profit totaled $1,329,010, against $961,391 in the initial three

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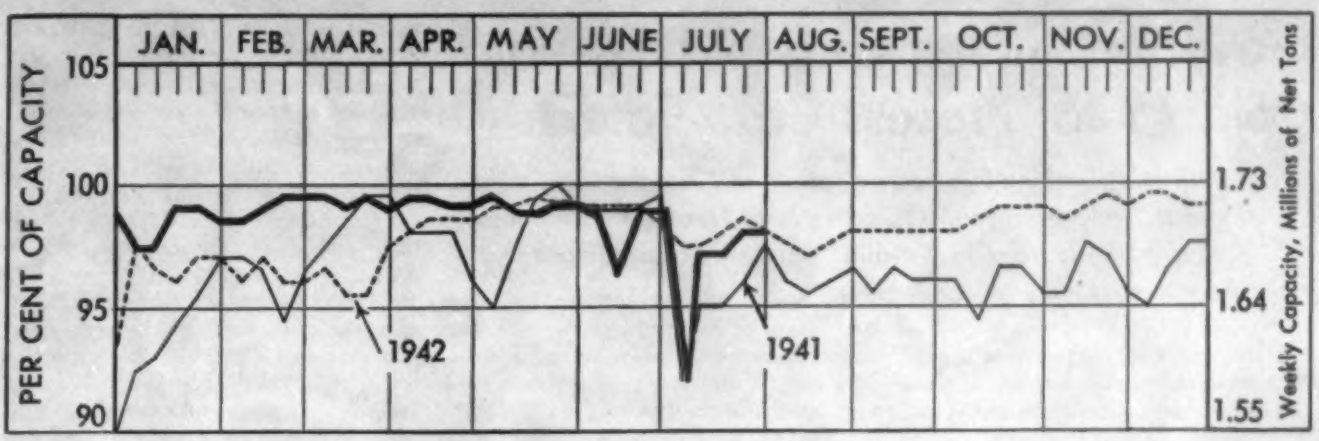

STEEL INGOT PRODUCTION BY MONTHS

Net Tons, 000 omitted

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1943	7,424	6,826	7,670	7,374	7,545	7,027	....	....	....	....	....	....
1942	7,112	6,512	7,392	7,122	7,382	7,022	7,148	7,233	7,067	7,584	7,184	7,303
1941	6,922	6,230	7,124	6,754	7,044	6,792	6,812	6,997	6,811	7,236	6,960	7,150
PIG IRON PRODUCTION												
1943	5,194	4,766	5,314	5,035	5,178	4,836	....	....	....	....	....	....
1942	4,983	4,500	5,055	4,896	5,073	4,935	5,051	5,009	4,937	5,236	5,083	5,201
1941	4,666	4,206	4,702	4,340	4,596	4,551	4,766	4,784	4,721	4,860	4,707	5,014

Scrap Stocks Drop

May total declines slightly from 6,918,000 in April to about 6,905,000

STEEL and iron scrap stocks held at plants of consumers, suppliers and producers at the end of May approximated 6,905,000 gross tons, a slight decrease from the 6,918,000 tons reported as of April 30, the Bureau of Mines reports.

The decline was caused by a decrease of 3 per cent in stocks held by suppliers and producers, while consumers' stocks increased slightly. Suppliers' and producers' stocks May 30 were 1,299,000 tons, compared with 1,335,000 tons at the end of April; consumers' stocks were 5,606,000 tons, compared with 5,583,000 tons. Most of the decrease in total stocks was due to a drop of 3 per cent in stocks in dealers' yards, while consumers' inventory gained 1 per cent.

Stocks at end of Month

(000 omitted)

	Scrap		
	Purchased	Home	Pig iron
May, 1943	5,414	1,491	1,328
Apr., 1943	5,416	1,502	1,327
Mar., 1943	5,343	1,507	1,350
Feb., 1943	5,354	1,517	1,370
Jan., 1943	5,401	1,476	1,302
Dec., 1942	5,501	1,429	1,272
Nov., 1942	5,363	1,379	1,191
Oct., 1942	4,956	1,304	1,130

Consumption during Month

	Scrap		
	Purchased	Home	Pig iron
May, 1943	2,053	2,670	4,511
Apr., 1943	2,019	2,623	4,423
Mar., 1943	2,102	2,685	4,660
Feb., 1943	1,857	2,321	4,162
Jan., 1943	1,942	2,550	4,515
Dec., 1942	2,016	2,481	4,465
Nov., 1942	1,905	2,496	4,360
Oct., 1942	2,061	2,709	4,594

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended July 31	Change	Same Week 1942	Same Week 1941
Pittsburgh	99	+ 1	93.5	100
Chicago	98.5	— 1	100.5	101
Eastern Pa.	93	None	95	95.5
Youngstown	98	+ 3	96	98
Wheeling	89	None	84	93
Cleveland	96	None	93	96
Buffalo	90	—2.5	95.5	90.5
Birmingham	95	None	95	90
New England	97	+ 2	100	88
Cincinnati	86	+ 1	88.5	91.5
St. Louis	92	None	95.5	98
Detroit	89	— 1	89	87
Average	98	None	*98	*97.5

* Based on steelmaking capacities as of these dates.

Coke Production for 1942 Sets 70,568,944-Ton Record

Production of coke in the United States during 1942 set a new high of 70,568,944 net tons, increase of 8 per cent over the 1941 total, according to the Bureau of Mines. The year's total comprised 62,294,909 tons of by-product coke, 7 per cent increase, and 8,274,035 tons of beehive, up 23 per cent above the 1941 figure.

Total value of coke, breeze, tar, and other by-products sold in 1942 was $629,408,422, another record and an increase of 17 per cent over the value for 1941. By-product coke showed a 19 per cent greater value over 1941.

Blast furnaces were the principal consumers of coke in 1942, using 55,491,570 tons, or 10 per cent more than for 1941. Foundries, manufacturers of producer gas and water gas, and other industrial plants consumed 9,190,418 tons, 12 per cent increase.

Ingot Rate 98%

Pittsburgh gains further from coal strike effects. Southern blast furnace taken off

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week was unchanged at 98 per cent of capacity. Four districts advanced, three declined and five were unchanged. A year ago the rate was 98 per cent; two years ago it was 97½ per cent, both based on capacities as of those dates.

Pittsburgh continued to recover from effects of the coal strike and gained an additional point. The Birmingham district is expected to reach 100 per cent this week as the last open hearth is returned to service. Hot blast furnace of the Tennessee Coal, Iron & Railroad Co. has been taken off for extensive repairs. This makes three idle blast furnaces in the Birmingham district.

Coal and coke production continues to recover from the effects of the recent strike in the coal mines.

Bars Head Products List In Volume in First Half

Steel bars produced for sale in the first half of 1943 totaled 6,504,598 tons and topped in volume all other steel products, surpassing plate output of 6,399,825 by a small margin, the American Iron and Steel Institute reported last week.

Sheet and strip amounted to 4,674,541, shapes 1,886,415, cold reduced tin plate 1,076,295 and all steel products combined 33,245,073 tons.

Government Action Seeks To Void Cold Metal Process Co.'s Patents

Complaint, instituted in federal court at Cleveland "in public interest," alleges fraud. Objective is to free certain manufacturing methods from an "invalid" patent thus enabling government to save on war contracts

SUIT was filed last week in United States District Court for the northern district of Ohio, at Cleveland, by the government in a move aimed at cancellation of two patents on methods and machinery for cold-rolling steel and other metals secured by Abram P. Steckel and owned by the Cold Metal Process Co., both of Youngstown, O.

The patents (Nos. 1,744,016 and 1,779,195) relate to a "four-high" rolling mill, having relatively small working rolls and larger backing rolls, with roller bearings on the backing rolls; to the method of operating such a mill through supplying power largely by tension on the delivered strip; and to the manufacture produced by the methods and machinery claimed.

The civil suit, filed "in the public interest," alleges that the patents were obtained through "a fraudulent conspiracy" which has given the company a monopoly in the use of the methods and machinery involved.

Patent Is Held Grant

The suit is instituted under the principle that a patent is a grant made in the public interest, not simply for the protection of private interests, and with the objective of freeing certain manufacturing methods from an invalid patent and thus enabling the government to enjoy substantial savings on war contracts.

The public interest which the government invokes was, in the Department of Justice's view, ignored by the parties to the illegal arrangement charged, "however reasonable their dealings may have appeared when viewed purely as an adjustment of conflicting private interests."

The complaint charges that as a result of the patent monopoly the government, through contractors, subcontractors and other suppliers of war materials, is being obliged to pay to the Cold Metal company "very large sums of money as royalties which in justice and equity defendant (Cold Metal) is not entitled to exact."

According to the complaint, the fraudulent conspiracy was carried out in this manner:

1. On June 30, 1923, Steckel filed application for a patent on a machine for cold-rolling metals, subsequently assigning the application to Cold Metals.

2. On April 6, 1926, Steckel canceled from his application certain claims after they had been turned down by the Patent Office for "lack of invention."

3. On April 20, 1926, through the same attorneys as filed the Steckel application, Florence C. Biggert Jr., and Lane Johnson, Pittsburgh, filed application for a patent on similar machinery, subsequently assigning the application to the United Engineering & Foundry Co., Pittsburgh.

4. Both applications were handled by the same attorneys who, the complaint states, "knew that there was a probable conflict between the two applications because both . . . disclosed common subject matter." The firm notified both clients of this fact, advising that Steckel was entitled to priority because of his earlier filing date.

5. On June 20, 1927, Cold Metals entered into an agreement with United whereby Biggert and Johnson continued to seek a patent and asserted, as an argument in favor of a patentable invention (for lack of which the Steckel claim had been rejected by the Patent Office), that United had had commercial success in the sale of the Biggert-Johnson mills embodying the common subject matter.

6. After Biggert and Johnson obtained a patent, the complaint charges, their attorneys copied into the Steckel application the claims made in the Biggert-Johnson application and asked the Patent Office to declare an interference between the two, "with the contemplation that such interference claims would without a contest be awarded to Steckel because of his earlier filing date."

7. Cold Metals thereby secured a patent under the Steckel application and issued a license under it to United.

"Deprived of Truthful Facts"

The complaint charges that by this "means and artifice" . . . "the Patent Office was deprived of the complete and truthful presentation of facts to which it was entitled in the consideration of said common subject matter claims and was led to believe that said claims embodied patentable invention which they did not in fact and in law embody."

The complaint further alleges that the argument by Biggert and Johnson "as to the unprecedented commercial success of their mill was a carefully planned subterfuge and the execution of a fraudulent conspiracy to induce the patent examiner to allow the common subject matter claims to Biggert and Johnson which had been denied to Steckel, and thus to circumvent the examiner by having a patent issued to Biggert and Johnson and then to transfer into a patent to Steckel the common subject matter claims from the Biggert-Johnson patent by the instrumentality of an uncontested interference proceeding."

UNUSUAL ACTION

Government suit to void the patents of the Steckel mill held by the Cold Metal Process Co., Youngstown, O., is described by the Department of Justice as the most important action of its kind in 50 years.

In 1893 the government sought unsuccessfully to cancel the patents of the American Bell Telephone Co. In that suit the government charged that the procedure of the Patent Office had been abused in order to delay the issue of the patent for 14 years after the application was made so as to gain patent protection for a total of 31 years instead of the statutory period of 17 years.

In 1897 the Supreme Court held that the government had not shown such evidence of fraud or conspiracy to warrant cancellation of the patent.

Steel Division Changes

Steel Division, WPB, has been reorganized with the following 11 branches under Jesse V. Honeycutt, assistant director of production:

ALLOYS STEEL BRANCH

L. E. Creighton, chief; S. A. Crabtree and J. K. Kilmer, deputy chiefs; G. L. McBreen, chief, Aircraft Alloy Section; P. E. Floyd, chief, Stainless Steel Section; J. P. Larkin, chief, Tool Steel Section; J. F. Reid, chief, Scheduling Section.

PLATE AND SHAPE BRANCH

M. W. Cole, chief; A. L. Meyer, chief, Plate Section; R. A. Marble, chief, Shape Section.

TUBING BRANCH

W. H. Wiewel, chief; L. W. Hartson, deputy chief; C. G. McDonald, chief, Aircraft Tubing Section; J. H. Weight, chief, Alloy Seamless Tubing Section; J. W. Davis, chief, Carbon Seamless Tubing Section; L. W. Hartson,

chief, Welded Tubing Section.

RAIL AND TRACK ACCESSORIES BRANCH

G. C. Bruner, chief; R. M. Thulean, chief, Rail Section; N. M. Bench, chief, Accessories Section.

COLD-FINISHED BAR BRANCH

E. B. Files, chief; V. R. Bates, deputy chief.

TIN PLATE BRANCH

R. F. Sentner, chief; J. T. Nichols, chief, Domestic Section; W. C. Brill, chief, Export Section.

SHEET AND STRIP BRANCH

L. F. Miller, chief; E. F. Clark, chief, Strip Section; M. M. Chapman, chief, Sheet Section.

CARBON BAR AND SEMIFINISHED BRANCH

W. F. Vosmer, chief; A. A. Wagner, deputy chief; E. A. Wallace, chief, Semifinished Section; A. A. Archibald, chief, Shell Steel Section; D. M. Schmid, chief, Carbon Bar Section; W. R. Klinkicht, chief, Reinforcing Bar and Rerolled Rail Section.

FORGINGS AND CASTINGS BRANCH

G. F. Hocker, chief; B. L. Weaver, chief, Steel Castings Section; R. F. LaMarche, chief, Iron Section; A. A. Ohmer, chief, Press and Open Hammer Forging Section; A. H. Shoen, chief, Drop and Upset Forgings Section; H. W. Davidson, chief, Armor Plate and Wheel and Axle Section.

WIRE AND WIRE PRODUCTS SECTION

H. M. Francis, chief; J. P. Barclay, chief, Wire Rope and Strand Section; H. E. Hartman, chief, Rod and Wire Products Section.

PIPE BRANCH

D. F. Lacey, chief; J. W. Owings, deputy chief.

WPB Asks Users of Seamless Cold Drawn To Specify Standard Sizes

MANUFACTURERS of cold-drawn seamless steel mechanical tubing have been requested by the War Production Board to solicit co-operation from all direct users of this product to conform to a series of standard sizes.

This follows action earlier this year in order L-211, schedule 6, which limited the sizes of cold-drawn mechanical tubing which could be supplied by mills to jobbers or warehouse stocks. Common practice had supplied more than 1600 different sizes for the warehouse trade, as well as for direct consumption. The order directed producers to follow "List 500", consisting of about 500 sizes from ¼-inch to 10½-inch outside diameter and 0.022-inch to 1 inch wall thickness.

The list represents a condensation by National Tube Co. of its most commonly used sizes, and was made in an effort to speed up production by concentrating output in as few variations as possible.

The WPB action does not require consumers of mechanical tubing to conform to these sizes, but requests that buyers stay within the limits of the table in their orders wherever possible.

Considerable gain in production of this critical product could result with full co-operation on this measure by consumers. "Down" time on the equipment producing seamless mechanical tubing is greatly extended when a large number of size changes must be made. Because of the nature of the product, orders are almost invariably small when judged by quantity standards of other steel products. Concentration on standard sizes would permit many of these small orders to be bunched together and run consecutively without need for changes in the equipment.

The list of standard sizes is shown in the following table:

Seamless Steel Mechanical Tubing—Round (Cold Drawn)

LIST 500—STANDARD SIZES—Theoretical Weight in Pounds Per Foot

Wall thickness		Outside Diameter in inches																												
Decimal of inch	Equivalent fraction	*¼	*⅜	*⅝	*⅞	½	⅝	¾	⅞	1	1⅛	1¼	1⅜	1½	1⅝	1¾	1⅞	2	2⅛	2¼	2⅜	2½	2⅝	2¾	2⅞
.022		.054	.068	.083																						
.028		.066	.085	.104	.123																					
.035		.080	.104	.127	.151	.174	.197	.221	.267	.314	.361	.384	.407	.431	.454	.478		.548								
.049		.105	.138	.171	.204	.236	.269	.301	.367	.432	.498	.534	.563		.629		.694	.759	.823	.890		1.02				
.065			.172	.215	.259	.302	.346	.389	.476	.562	.649	.693	.736	.780	.823	.866	.910	.996	1.08	1.17	1.26	1.34		1.52		
.083					.315	.370	.426	.481	.591	.702	.813	.869	.924		1.03		1.15	1.26		1.48		1.70		1.92		
.095					.348	.411	.475	.538	.665	.791	.918	.982	1.05	1.11	1.17	1.24	1.30	1.43	1.55	1.68	1.81	1.93	2.06	2.19	2.31	2.44	2.57	2.70	
.120						.487		.647	.807	.968	1.13	1.21	1.29	1.37	1.45	1.53	1.61	1.77	1.93	2.09	2.25	2.41	2.57	2.73	2.90	3.05	3.21	3.37	3.53
.156	5/32							.781	.990	1.20	1.41	1.51	1.61	1.72	1.82	1.93	2.03	2.24	2.45	2.66	2.86	3.07	3.28	3.49	3.70	3.91	4.11	4.32	4.53
.188	3/16								1.13	1.38	1.63	1.76	1.88	2.01	2.13	2.26	2.38	2.63	2.89	3.14	3.39	3.64	3.89	4.14	4.39	4.64	4.89	5.14	5.40
.219	7/32									1.53	1.83	1.97	2.12	2.27	2.41	2.56	2.70	3.00	3.29	3.58	3.87	4.17	4.46	4.75	5.04	5.34	5.63	5.92	6.21
.250	¼										2.00	2.17	2.34	2.50	2.67	2.84	3.00	3.34	3.67	4.01	4.40	4.67	5.01	5.34	5.67	6.01	6.34	6.68	7.01	
.313	5/16													2.93	3.13	3.34	3.55	3.97	4.39	4.80	5.22	5.64	6.06	6.48	6.89	7.31	7.73	8.15	8.56
.375	3/8														3.50	3.76	4.01	4.51	5.01	5.51	6.01	6.51	7.01	7.51	8.01	8.51	9.01	9.51	10.0	
.438	7/16																	4.97	5.53	6.14	6.72	7.31	7.89	8.48	9.06	9.65	10.2	10.8	11.4	
.500	½																	5.34	6.01	6.68	7.34	8.01	8.68	9.35	10.0	10.7	11.4	12.0	13.7	
.625	5/8																					9.18		10.9	11.7	12.5	13.4	14.2	15.0	
.750	¾																									14.0		16.0	17.0	
.875	⅞																													
1.000	1																													

Wall thickness		Outside diameter in inches																												
Decimal of inch	Equivalent fraction	3	3¼	3½	3¾	3½	3¾	4	4¼	4½	4¾	5	5¼	5½	5¾	6	6¼	6½	6¾	7	7¼	7½	7¾	8	8½	9	9½	10	10½
.065		2.04				2.30		2.73																						
.083																														
.095		2.95		3.30	3.33	3.46	3.71	3.96	4.22	4.47	4.72																			
.120		3.69	3.85	4.01	4.17	4.33	4.65	4.97	5.22	5.61	5.93	6.25	6.58	6.90																
.156	5/32	4.74		5.18	5.36	5.71	5.99	6.40	6.82	7.24	7.65	8.07	8.49	8.90																
.188	3/16	5.65	5.90	6.15	6.40	6.65	7.15	7.65	8.16	8.66	9.16	9.66	10.2	10.7	11.2	11.7	12.2													
.219	7/32	6.50	6.80																											
.250	¼	7.34	7.68	8.01	8.34	8.68	9.35	10.0	10.7	11.4	12.0	12.7	13.4	14.0	14.7	15.4	16.0	16.7	17.4	18.0	18.7	19.4	20.0	20.7	22.0	23.4	24.7	26.0	27.4	
.313	5/16	8.98	9.40	9.82	10.2	10.7	11.5	12.3	13.2	14.0	14.8	15.7		17.3		19.0														
.375	3/8	10.5	11.0	11.5	12.0	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	32.5					
.438	7/16	12.0	12.6	13.2	13.7	14.3	15.5	16.7	17.8	19.0	20.2	21.3																		
.500	½	13.4	14.0	14.7	15.4	16.0	17.4	18.7	20.0	21.4	22.7	24.0	25.4	26.7	28.0	29.4	30.7	32.0	33.4	34.7	36.0	37.4	38.7	40.0	42.7	45.4	48.1	50.7	53.4	
.625	5/8	16.9	16.7	17.5		19.2	20.9	22.5	24.2	25.9	27.5	29.2	30.9	32.5	34.2	35.9		39.3	40.9			45.9								
.750	¾	18.0		20.0		22.0	24.0	26.0	28.0	30.0	32.0	34.0	36.1	38.1	40.1	42.1	44.1	46.1	48.1	50.1	52.1	54.1		58.1	62.1					
.875	⅞	19.9		22.2		24.5	26.9	29.2	31.5	33.9	36.2	38.6	40.9	43.2	45.6															
1.000	1	21.4		24.0		26.7	29.4	32.0	34.7	37.4	40.1	42.7	45.4	48.1	50.7	53.4	56.1	58.7	61.4	64.1		69.4		74.8	80.1					

Items listed above have been adopted by WPB (L-211, Schedule 6, Feb.25, 1943) as standard sizes for cold-drawn seamless mechanical tubing with carbon 0.30 per cent or less and sulphur 0.05 per cent or less. Sizes marked with asterisk not available under present operating conditions.

WINDOWS of WASHINGTON

May Get Action

THE report of the Truman Committee alleging that Wright Aeronautical Corp., a Curtiss-Wright subsidiary, delivered defective equipment to the government has revived interest in a bill introduced earlier this year by Senator Hobbs (D. Ala.). It would impose penalties of death, life imprisonment or a $1,000,000 fine on officers of firms delivering defective equipment to the armed forces.

The bill has never been reported to the House by the Judiciary Committee. A subcommittee held hearings and the bill as originally written was modified. That was as far as it got. Representative Hobbs believes that inasmuch as more Truman disclosures are slated to be made public it is quite likely that his bill will come up for further consideration after Congress reconvenes in September.

More Shortages

Shortages: The paper supply, after a short, easier interlude, again is tightening; the shortage is particularly bad in brown paper and in paper and cardboard containers. . . . The manila rope situation is becoming more critical, due largely to the huge quantities required on ships, in parachute flares and other war items. . . . Second half program calls for collection of 15,000,000 tons of iron and steel scrap and this is considered a colossal task in view of the shortage of labor in scrap yards.

Iron Customer

Food enrichment has provided a new customer for iron—the flour milling and white bread baking industries. At present, under voluntary compliance, 75 per cent of flour contains a minimum of 6 milligrams of iron per pound of product and 75 per cent of white bread contains a minimum of 4 milligrams of iron per pound of flour. The standard has been raised by the Federal Security Agency through the Food and Drug Administration and on and after Oct. 1 it will call for a minimum of 13 milligrams of iron in a pound of flour and 8 2/3 milligrams of iron in a pound of white bread. Whereas niacin and vitamin B-1 now are added, riboflavin also will be added on and after Oct. 1.

The iron is added in the form of reduced iron or pure iron, or in the form of compounds, principally sodium iron pyrophosphate and ferric phosphate. Somewhat less iron than the above figures actually are added because the flour in its original state has some iron, usually in the neighborhood of 3 milligrams a pound. In making their studies the experts even took into account the iron that goes into flour and bread because of wear on the milling and dough-mixing machinery. The process is one, therefore, where bread eaters get added nutrition and makers of repair parts get added business.

In case anyone wants to figure out how much iron is used in making bread, current output of white flour is 120,000,000 barrels yearly while output of white bread ranges between 12,000,000,000 and 13,000,000,000 pounds annually. About 75 per cent of bakers and millers comply voluntarily with the enrichment standard. The War Food Administration is expected soon to take action to make compliance mandatory.

SELLING IN REVERSE

Rolf Nugent's idea of "installment selling in reverse" whereby consumers pay now for goods to be delivered after the emergency has been adopted by a number of business and manufacturing interests. Cessna Aircraft Co., Wichita, Kans., reports more than 1000 persons, by earmarking war bonds, are arranging to buy airplanes for delivery after the war.

Commercial Investment Trust Inc., 1 Park avenue, New York, has a plan under which used cars are sold to dealers and the money retained in the form of deposits to be used as partial payments for new cars in the future.

Radio Corp. of America is accepting payments now for movie theater equipment for delivery when and as produced.

Mr. Nugent, incidentally, has resigned as director of the credit policy office of the Office of Price Administration and now occupies a post in the War Food Administration.

Scrap Segregation

The revised alloy steel scrap segregation orders M-24-c and M-24-d are to be made "mandatory" in the near future. Despite the pressures that were brought to bear adequate segregation methods are not prevalent at all plants. The Navy's system of color identifications of different analyses has helped considerably, as have the color systems of some individual companies. However, segregation has not been "sold" with sufficient vigor to plant workers.

Not a Chance!

Informed observers in labor circles here do not believe Philip Murray's call upon the American Federation of Labor and the railroad brotherhoods to unite with the Congress of Industrial Organizations on 1944 election objectives has any remote chance of favorable action. AFL men accuse CIO of cashing in on AFL's prestige, that CIO is riding on Roosevelt's coat tails, and that CIO must favor a fourth term for survival. AFL, with dues-paying membership around 6,200,000, is resentful of CIO claims of 5,000,000 members; AFL officials say CIO dues-paying membership could not possibly be above 2,150,000. That is why AFL recently refused President Roosevelt's invitation to appoint representatives to a labor mission to Europe with an equal number of CIO representatives. AFL officials believe there is good chance that the United Automobile Workers will desert CIO and follow John L. Lewis into the AFL.

Cadmium Critical

The supply of cadmium is getting more critical. Conservation Division of the War Production Board is getting ready to launch a campaign to conserve cadmium through use of substitutions but principally by encouraging platers either to use thinner coating or to eliminate wasteful methods of plating by which the coat is thicker in some places than in others.

New Cartridge

Light, small, 30-caliber ammunition, of a new type requiring less than one-third the amount of brass used in the ordinary 30-caliber cartridge, is being produced in several plants of the Remington Arms Co., Bridgeport, Conn., at the rate of over 130,000,000 rounds a month.

The new ammunition, known as 30M1, is less than half the weight and one-fourth the volume of the usual type, and has deadly accuracy at 300 yards. It is used in the new 30-caliber carbine.

Production of type 30M1 ammunition was begun less than a year ago, but it has shown excellent battle results in Sicily and the Aleutians. Aside from the saving in brass, the new ammunition is so small and light that a hundred or more of the cartridges can be carried in a soldier's tunic pocket. Cargo space is also saved, as a case holding 3450 rounds occupies less than half the space of a 1500-round case of ordinary ammunition.

Tax Boost Involved in Proposed Broadening of Present Act

Implications in suggested changes merit close attention of employers. Benefits not only would be extended to larger part of population but socialized medicine setup, financed by steep increase in taxes, is included

MANUFACTURERS and other employers will do well to give thought to the bill now pending in the Senate to broaden the Social Security act. Sponsored by Senators Robert F. Wagner (D. N. Y.) and James E. Murray (D. Mont.), the bill is aimed at removing exemptions under the act as it now stands. These exemptions now prevent domestic and farm workers, sailors, employes of religious and charitable institutions, public servants and several other groups from enjoying the old age pension and unemployment insurance benefits of the act.

It seems unlikely that Congress will object to this feature of the Wagner-Murray bill since it is the general feeling that as long as we have social security it should be universal.

But the bill thereafter proposes a socialized medical setup—a government medicine scheme—that would be run from Washington by the United States surgeon general. It would be financed by a steep increase in all social security taxes. Employer and employe, each, would pay 6 per cent of wages up to $3000 a year, as against the present 1 per cent from employes and up to 4 per cent from employers. That would come on top of the present 20 per cent withholding tax. One-fourth of the revenue thus raised would go to finance the federal government medical program, that is, an estimated $3,000,000,000 a year.

Envisages Broad Program

The surgeon general would be required by this bill to arrange for general medical, special medical, laboratory and hospital services for some 110,000,000 Americans covered by the broadened Social Security act. He would have power to enlist physicians and hospitals, fix fees of physicians so enlisted, limit the number of patients to be cared for by each physician, prorate patients among available physicians, finance medical education and research.

Out of his $3,000,000,000 a year the surgeon general would spend about $600,000,000 for administration and would pay out $2,400,000,000 in benefits. Under the head of benefits he would spend 2 per cent of the $2,400,000,000, or $48,000,000, on medical research and education.

By this setup, the surgeon general automatically would become one of the most powerful administrators in the land. With these huge funds at his disposal he could be absolute czar of the medical profession and of hospitals, medical schools and medicine.

Enactment of this bill in its present form would be a blow to our free enterprise system. Many members of Congress will oppose it on that basis, for the majority in Congress favors perpetuation of the American free enterprise system if it is at all possible.

But what Congress will do about this particular proposal to nationalize medicine is not so sure. The trouble is that the medical profession as it has operated in the past has not done a very good public relations job for itself.

Many signs indicate that groups in this country in future will be treated on the basis of the degree of responsibility they are willing to assume. When the Wagner-Murray bill comes up for hearings, the doctors will have an opportunity to speak their piece and tell Congress what sort of a program they would be willing to work out voluntarily to take care of the physical well-being of all the people. If they fail to convince Congress of their ability to work toward this objective in an organized way, it is entirely likely Congress might take some action. But if the doctors tell a good story it is more than likely that Congress will refuse to place them in shackles.

TASK FORCE BUILDING: Specially engineered by the Tennessee Coal, Iron & Railroad Co. in co-operation with Army and Navy personnel for use by our armed services overseas steel utility structures such as shown in the accompanying illustrations are designed so that component parts nest together and require a minimum of shipping space. A 20 x 50-foot unit requires slightly less than 5½ tons of steel and all parts take only 225 cubic feet of shipping space.

They are manufactured by the Southern States Iron Roofing Co., Savannah, Ga., and distributed by the United States Steel Export Co., 30 Church street, New York. Large numbers of the units already have been ordered by the Navy for use as mobile hospitals. They also may be used as living quarters, mess halls or storage rooms.

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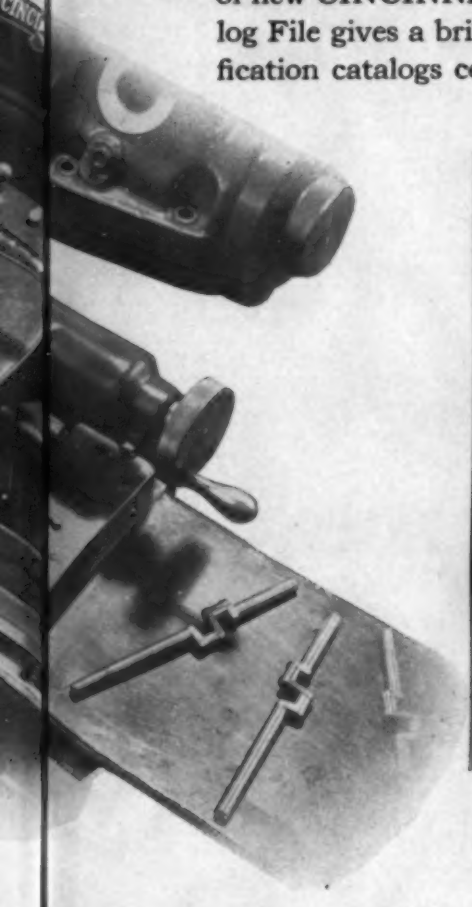

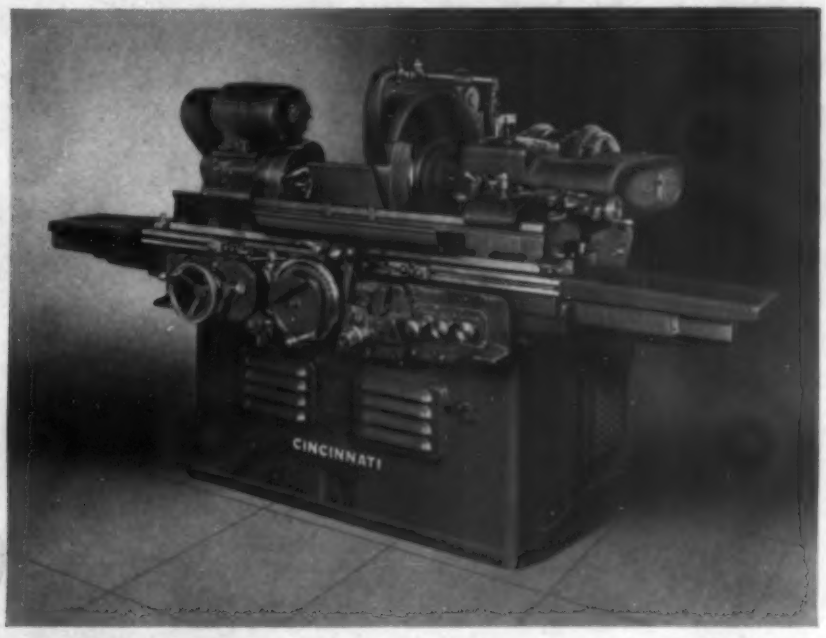

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PRIORITIES-ALLOCATIONS-PRICES

Weekly summaries of orders and regulations, together with official interpretations and directives, issued by War Production Board and Office of Price Administration

INSTRUCTIONS

STEEL PRODUCERS: Symbol "FC" will be used by the Steel Division to identify allotments of controlled materials made to steel producers on form CMP-4B under CMP regulation No. 8. Steel producers who receive purchase orders bearing allotment numbers identified by the symbol "FC" should report their shipments of such orders under that symbol on "Monthly Reports of Shipments and Past Due Orders" form CMP-8.

RADIO WIRE: Radio jobbers may apply for relief to the War Production Board on form WPB-1161 (formerly PD-470) listing frozen stocks of copper wire mill products by amounts, sizes and types which cannot be sold in accordance with CMP regulation No. 4. In the event an application should be approved by WPB, copper wire sold under such authorization cannot be replaced in stock.

MRO SUPPLIES: Ratings assigned for third quarter of 1943 only, to governmental agencies and institutions on WPB-837 (formerly PD-408) for maintenance, repair and operating supplies may be used to the extent authorized on the form. Use of these ratings is permitted as an exception to restrictions of priorities regulation No. 3 which prohibits use of ratings assigned for MRO supplies for certain items on List B.

E ORDERS

HAND TOOLS: Special endorsement formerly needed for hand tools, including precision measuring instruments, will be eliminated Aug. 15 from provisions of order E-5-a since direction 9 to CMP regulation No. 5 now provides an overall method under which workers may obtain tools. (E-5-a)

L ORDERS

CLOSURES: Production of slide fasteners for civilian use may be resumed on a limited scale. Only distress stocks of carbon steel obtained from the Steel Recovery Corp. may be used for civilian needs and in no case may the quantity processed in any quarter exceed ⅓ of average quarterly consumption of all metals by the individual producer concerned during the year ended June 30, 1941. Slide fasteners of the separating type cannot exceed 27 inches in length. Production and sale of slide fasteners for skirts and dress plackets for uniforms for the women's auxiliaries of the armed forces are permitted. Carbon steel can be used for the manufacture of hooks, eyes, and snap fasteners for civilian use in an amount equal to 1941 consumption. Discrimination in sales and deliveries is prohibited. Slide fasteners or chain produced for the armed forces but failing to meet specifications may be sold or delivered only when specifically authorized by WPB. Manufacturers wishing to produce slide fasteners for civilian use should file an appeal with WPB for relief from restrictions of order M-126, which now prohibits use of steel for that product. They should forward to J. D. Clokey Jr., Steel Recovery Corp., 5835 Baum boulevard. Pittsburgh, information regarding their requirements in properly balanced quantities of each item, indicating the exact dimensions and other specifications of material suited to their facilities. Initial allotments of metal will not be made prior to Aug. 5. (L-68)

SAFETY EQUIPMENT: Restrictions on use of copper-base alloys and alloy steel in manufacture of certain items of safety equipment have been eased. In addition to the permitted uses set forth in appendix "A" of the order as amended May 5, copper-base alloy may now be used in internal valve mechanisms of safety filling cans with flexible pour spouts, provided net weight of the alloy does not exceed 2 ounces per can and provided it is not used in screens (or parts thereof) designed for non-flash-back or strainer purposes. Alloy steel of NE-8630 or lower grade now may be used for foot and toe guards to the extent necessary to provide protection against impact injuries. (L-114)

USED CONSTRUCTION EQUIPMENT: Farmers are exempted from registering their used construction equipment under terms of order L-196 while registration of 22 small items, irrespective of ownership, is also exempt. Deleted items include: rock drills, jackhammers, screens, kettles and heaters. (L-196)

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BUILDERS' FINISHING HARDWARE: Certain fabricated parts, hitherto frozen in inventory by order M-9-c, have been released for use in manufacture of builders' finishing hardware, cabinet locks and padlocks. Parts affected are those which were in possession of the producer on or before May 31, 1943, and in which 10% or more of the total weight is metal other than copper or copper base alloy. (L-236)

FARM MACHINERY: Small producers of farm machinery and equipment have been exempted from requirements that production schedules must be approved by WPB. Small producers are defined as any producer whose total net sales (including export and sales by affiliates) of all products did not exceed $100,000 during 1941. Included also are any producers classified by the Smaller War Plants Corp. as a "smaller, distress producer" and specifically designated as such by WPB. (L-257)

LUGGAGE: Use of iron and steel for valances, bindings and corners on foot lockers and for hangar bracket assemblies in men's wardrobe luggage is now permitted. (L-284)

WELDING EQUIPMENT: Purchase orders for resistance welding equipment received prior to July 27 are exempt from delivery restrictions imposed previously by WPB. (L-298)

POWERCYCLES: Production of powercycles now are limited to those manufactured from fabricated parts in inventory on July 1, 1943, or to those specifically authorized by WPB. Production of repair parts is permitted at the rate of 123 per cent of 1942 output. Distribution is restricted to the Army, Navy, Maritime Commission, War Shipping Administration and for Lend-Lease. Persons engaged in essential war industries may apply on WPB-1319 for authorization to purchase powercycles, defined as any two or three wheeled vehicle propelled by an internal combustion engine which has a displacement of less than 25 cubic inches. Motorcycles are not included. (L-301)

M ORDERS

STEEL ALLOYS: Technical descriptions of uses for which certain analysis of alloys are permissible have been clarified by the War Production Board. The order refers to heat-resistant chromium or chromium-nickel alloy iron and alloy steel materials. (M-21-g)

GRAPHITE: Manufacture of graphite crucibles has been limited by WPB. Certain sizes of standard crucibles may no longer be made and no manufacturer may make any size of special crucible he had not made before July 27. (M-61-a)

CADMIUM: Use of cadmium in pigments is prohibited, except for specific purposes, most of which are military. (M-65-a)

CARBON BLACK: Manufacturers requiring furnace type carbon black in quantities between 100 and 5000 pounds in any month are not required to obtain direct or specific allocation from the WPB. Under the new procedure, orders within these limits are placed directly upon suppliers of carbon black, who in turn on the 20th of each month furnish the Chemicals Division, WPB, with a list of orders received. The division then confirms or denies the orders. Specific allocation must be made for amounts of more than 5000 pounds. Primary products for which furnace type carbon black may be used are specified in the order. (M-244)

ABRASIVES: Production and sale of any bonded abrasive product containing abrasive grain manufactured from fused aluminum oxide (other than reclaimed grain) of any grit size 80 or coarser will be prohibited after Aug. 1 for mill, burr and hulling stones; grinding wheels used in the following operations: beveling or edging cut glass, grinding bath tubs and sanitary ware, grinding porcelain articles other than spark plugs, and grinding advertising novelties; non-slip products, including non-slip tiles. Manufacture or sale of the following bonded abrasive products containing aluminum oxide wheel grain (other than reclaimed grain) of any grit size 80 or coarser is prohibited: oil, scythe, and all other sharpening stones and hand rub bricks; pulp stones, grinding wheels for use on hand grinders; air diffuser plates and tubes, except for maintenance and repair of existing facilities. Manufacture and sale of rubber bonded abrasives products is prohibited except for the following permitted types: centerless grinding and centerless control wheels; shank mounted wheels and nut mounted bobs three inches and smaller in diameter; mounted sticks; cut-off wheels; bonded cork or cotton products; or for the following operations if the order is certified as prescribed: ball and roller race-grinding; grinding heat-sensitive steels; grinding rubber and asbestos products; side grinding operations with thin wheels for removal of fins and burrs where safety requires use of a rubber bonded wheel; soft polishing operations; form grinding; slot grinding; weld grinding at the bottom of slots; precision grinding operations where the use of rubber bonded abrasive products is necessary to resist a dressing action; finish grinding stainless steel strip and sheet bars where rolling practice requires finishes obtainable only through the use of rubber bonded abrasive wheels. Coating and sale of coated abrasive products containing abrasive grain manufactured from fused aluminum oxide (other than reclaimed grain) of any grit size 80 or coarser is restricted for the following purposes: floor surfacing, wood working, shoe repairing, and non-slip products. (M-319-a)

U ORDERS

WIRE EQUIPMENT: Necessity for an exchange of ratings between operators of communications systems in transferring equipment among one another has been eliminated. (U-5)

PRICE REGULATIONS

SILVER: Manufacturers of semi-fabricated silver products now are authorized by OPA to charge the same prices for products made

of Treasury silver sold under the Green act as they are permitted to charge for items made of newly-mined domestic silver. The Green act provides that Treasury silver sold under its terms cannot be sold at less than 71.11c per fine troy ounce. (GMPR)

COKE: Producers of coke now may file applications for an adjustment in their maximum prices when receipts from the sale of their entire production at ceiling prices do not equal total costs of production. (No. 121)

MAGNESIUM: Magnesium remelt ingot containing a combination of No. 4 and No. 17 alloys has been removed from the Class A ingot price list by Office of Price Administration. It is now priced as a Class B or Class C ingot, according to its alloy content. Maximum base price for Class A ingot is 21.50c a pound; for class B, 18.50c; and Class C, 16.00c. Premium of 1 cent a pound which sellers were permitted to charge for segregated scrap containing a combination of both No. 4 and No. 17 alloys has been revoked. (No. 302)

Simplifies Program for Farm Machinery Distribution

War Food Administration has authorized manufacturers of farm machinery and equipment to distribute up to 40 per cent of their production in the year beginning July 1, 1943 of items now listed for rationing under WPB order L-257, which provides for specific quotas for various farm machines and equipment and permits unlimited production of repair parts.

Under the terms of the order manufacturers may distribute up to 40 per cent of their production as they see fit through normal distribution channels. However, they are first required to fill quotas issued to them by the War Food Administration, which were designed to place rationed items of farm machinery and equipment where they would be needed to satisfy state and county quotas established under last year's machinery distribution program. This refers to machinery produced under WPB order L-170.

RFC Subsidiaries Organize Price Adjustment Board

Joint Price Adjustment Board has been established by Defense Plant Corp., Defense Supplies Corp., Metals Reserve Co. and Rubber Reserve Co. to carry out the recent act of Congress bringing these subsidiaries of the Reconstruction Finance Corp. under the Renegotiation of Contracts law. Members of this board are: C. B. Henderson, S. H. Husbands, H. J. Klossner, H. A. Mulligan and C. T. Fisher Jr., all directors of RFC.

Mr. Fisher has been named chairman of the board while R. C. Patterson, formerly of the Bureau of the Budget, has been appointed chief administrative officer to the Joint Price Adjustment Board.

Easier Supply Situation Develops in Magnesium and Some Ferroalloys

INCREASED production has resulted in an improved position in magnesium, while certain other critical nonferrous metals and ferroalloys are slightly easier, largely reflecting more direct channeling to essential needs. This is revealed in issue No. 9 of the Material Substitution and Supply List, issued by the Conservation Division, War Production Board.

Some 500 materials are classified by their relative availability and are divided into three groups. Group I lists those insufficient currently for essential war and industrial needs.

The metals in this group which are most critical are: Bismuth and cadmium (relatively small total production), tin, copper, zinc, tantalum, molybdenum, nickel, columbium, chrome-nickel stainless steel, straight chrome stainless steel, steel bars (1½ inches and larger), steel forgings, and seamless steel tubing.

Aluminum Still Critical

Metals which are only slightly less critical are: Aluminum, beryllium, lithium, iridium, osmium, tungsten, vanadium, silicon metal, chromium, AISI or SAE alloy steel, NE alloy steel, high speed tool steel, low phosphorous pig iron, alloy cast iron, open hearth carbon steel, and the following steel products: plates, sheet and strip, bars (under 1½ inches, except reinforcing), wire rope, wire products (except wire mesh reinforcing), castings, tin plate, terne plate, and galvanized sheet.

Manufacturers and individuals writing specifications are requested by the Conservation Division to keep relative tonnages in mind when planning substitutions. Otherwise small tonnage substitutes become exhausted quickly. For this reason any large tonnage ferrous metal is usually preferred to any smaller tonnage nonferrous or plastic.

The choice between steel and wood depends largely on type of need, application and local conditions, the report said. However, no relative change has occurred in the wood supply situation which necessitates wholesale switches back to steel, although most hardwoods and most one-inch boards of all species have been placed in group I.

Certain fabricated forms of metals are much tighter than the raw materials themselves or other fabricated forms because of shortage of processing facilities or manpower, for example aluminum forgings. In addition to straight substitution, a growing practice that is easing critical requirements is "downgrading" or substitution of alloys with only slightly different characteristics, particularly in casting applications.

With the increasing prevalence of labor shortages, greater emphasis must be placed on the use of materials which are suitable for low unit labor processes, such as stamping, die molding and die casting.

Coal strikes and other labor difficulties have retarded steel production, and the scheduled increase in the military procurement program involves increases in steel consumption in excess of any presently scheduled expansion of steel production, the Conservation Division says.

Metals in group II, which includes those materials essential to the war program but which enjoy supplies at present sufficient to meet war demands plus essential industrial demands, include: Magnesium, calcium, platinum, ruthenium, rhodium, mercury, indium, silver, cobalt, low carbon ferromanganese, ferroboron, zirconium and alloys, silicomanganese, ferrosilicon, spiegeleisen, silvery iron, tool steel (except high speed), wrought iron, malleable and gray cast iron, pig iron (except low phosphorous), bessemer steel products and the following additional steel products: lead-coated sheets, black plate, pipe, rails, structurals, piling, wire mesh reinforcing, reinforcing bars, and rerolled rail products.

Metals which are available for essential uses and which should be substituted for the scarcer materials in groups I and II wherever possible unless supplies are restricted locally by labor, manufacturing or transportation difficulties follow: Antimony, antimonial lead, ferro-carbon-titanium, high carbon ferromanganese, gold, lead, and palladium.

Construction of Shasta Power Line To Be Rushed

Bureau of Reclamation has been ordered to expedite construction of the Shasta-Oroville transmission line of the Central Valley project in northern California. The War Production Board has allotted 1,207,800 pounds of aluminum to be used in lieu of copper as the conductor for the electrical energy the line will carry. Estimated cost of the 98-mile line is $1,900,000. The Shasta Dam power plant will make available 150,000 kilowatts in March, 1944.

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From the deck of a ship a plane is shot into the air ...catapulted by a giant "sling" that imposes a load of about one million pounds on the Hyatt Roller Bearings in its mechanism.

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Fighting against friction... and for America!

Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.

HYATT ROLLER BEARINGS

By A. H. ALLEN *Detroit Editor, STEEL*

MIRRORS of MOTORDOM

Australia's industry still has to build its first complete motor car but the industrial mobilization job which the commonwealth has done since 1939 is little short of amazing. Conversion to war production outstanding

THE COMMONWEALTH of Australia still has to see the first complete motor car built by its own industry, but the industrial mobilization job which the country of sheep and kangaroos has wrought since 1939 is little short of amazing when the facts are known.

Hundreds of thousands of American boys stationed in Australia perhaps now are gaining some realization of the commonwealth's war job, but there is scant perception of the extent of the task in this country. For that reason it may be pertinent to review some of the facts.

Intimately connected with war industry is the problem of manpower. Australia has a population of 7,000,000, of whom 5,000,000 are between the ages of 14 and 65. Of a total male population of 2,530,000 between these ages, about 1,500,000 are now on full-time war work, including members of the fighting forces. Since September, 1939, the number of factory workers on actual war jobs has increased 38-fold, total factory employes numbering 709,000, or not quite the equivalent of industrial employment right now in the metropolitan area of the city of Detroit.

At the outbreak of war in September, 1939, government and semigovernment munition factories, aircraft plants and shipbuilding yards employed 13,500 men and women. Today the figure, including workers on direct war contracts in private plants, has increased to 515,000 or roughly the equivalent of peak prewar employment in motor vehicle and body plants in the United States.

These figures and related information are from an illustrated booklet titled *The Job Australia Is Doing*, published in New York by the Australia News and Information Bureau, an agency of the commonwealth government.

With regard to arms production, when war broke out in 1939, Australia had four munitions factories; these had grown to eight in number when Japan struck at Pearl Harbor. Now there are 49 government munitions plants, 25 in operation and 24 more authorized, with 170 "munitions annexes." Production range includes cruiser tanks, combat war planes including engines, armored universal carriers and cars, destroyers, corvettes, harbor defense vessels, freighters, mines, aircraft bombs, three types of mortars, field guns including 25-pounders, two types of submachine guns, four types of machine guns, three types of antiaircraft guns, pistols, rifles, respirators, grenades, parachutes, all forms of pyrotechnics, 53 types of radio, antiaircraft predictors (range finders), 32 types of optical munitions, searchlights, and 73 types of ammunition.

The heat was really turned on production in 1940 after the evacuation of Dunkirk by the British. Essington Lewis was appointed director-general of Australian munitions, and other leading executives were named by the government to control individual branches of production like ordnance and armored vehicles. Boards of Area Management were set up to consolidate and boost local resources.

Machine Tools Controlled

The government took control over all machine tools. None could be bought, sold or transferred without permission. It bought quantities of machinery from the United States, built up local industry and absorbed its output, and bought thousands of machines where they stood in private shops. Machinery was redistributed through expanding industry. If a plant could do better or quicker work by adding a process under its own roof instead of sending it out to a subcontractor it was allocated necessary machinery as soon as it was available.

The result? In 1939 Australia had five plants building machine tools; now there are 75. In 1939 less than 100 machine tools would have been good production for Australia; at present 20,000 machines have been built or are building since the beginning of the war. Plants numbering 188 are now producing tools and gages, compared with two in 1939; and these 188 units are being asked to turn out 26,000 tools and gages daily.

Industry was decentralized away from the seaboard. New weapons were developed like the Owen machine gun which is made at a cost of $28.16 against an average price of $128 for a Thompson submachine gun. Manufacture of combat tanks was undertaken and technique developed for casting a complete tank hull before a similar procedure was developed in the United States. British Beaufort torpedo bombers were put into production. Production of advanced training and observation aircraft was extended. Armor plate is pouring from the steel mills of the Broken Hill Proprietary Co. Ltd. Five thousand miles of new strategic highways have been built by the Allied Works Council in the last year, three principal ones being the East Australian Inland road, the North-South Transcontinental Road and the northern East-West road. Australian state railways showed a 68 per cent increase in gross ton-miles over a four-year period, despite the exasperating difficulties involved in transfer of freight at state borders because of differences in track gages.

Capital expenditures authorized on government munition plants to December, 1942, were $170,570,000 and on munitions annexes $45,860,000. Since the start of war the value of Australia's

Truck assembly line of the International Harvester Co. of Australia, Pty. Ltd. at Melbourne. These trucks are destined for the armed forces

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Assembling military mobile tractor cranes at the Melbourne branch of the International Harvester Co. of Australia, Pty. Ltd. The entire Australian company went to war early in 1940 supplying a wide variety of war equipment

munitions output has reached $167,351,000. Striking as these figures are for a country of 7,000,000 population, they still fall far short of comparable expenditures in the United States, even applying a factor of 20 to compensate for the greater population of this country.

The Australians are a trifle touchy on the subject of lend-lease, pointing out that they have gone to great lengths on "reciprocal aid" which includes as a most important item the feeding and housing of American troops there. Estimated expenditure on reciprocal lend-lease for the financial year 1942-43 by Australia is $177,000,000, and figured on a population basis the value of reciprocal aid which Australia is giving the United States is calculated to be seven times as great as the aid which this country has made available to Australia. For purposes of Allied unity it is best to pass over this phase a little hurriedly.

By virtue of proximity, Japan is the commonwealth's No. 1 enemy, and although Anzac divisions fought Britain's fight on every front long before Pearl Harbor, the all-out phase of Australia's effort did not begin until the Japs began moving into the southwest Pacific. When General MacArthur arrived in Australia from the Philippines, he was greeted as the savior of the country and is still aces with the Aussies.

Study Japanese Equipment

Australian engineers have made detailed studies of various types of captured Japanese war equipment and they report a lot of it is surprisingly good construction. A captured 16-ton tank, for example, showed complete originality of design, fine workmanship and no stinting of materials. The power plant was a 6-cylinder in-line air-cooled diesel, a type of engine which many tank experts in this country would like to see available, but there is nothing like it now being built here.

Speaking of tanks, it is interesting to note the proportions of the job of spare parts supply for American tanks in the field. Such parts are produced in "sets," one set being the number of spare parts required to service 100 tanks in the field for one year, totaling nearly 90,000. A shipment of a complete set of parts weighs 500 tons and requires 16 freight cars to handle. Nearly 2000 boxes and bundles are involved plus more than 4 miles of steel strapping to secure them.

In addition, according to information supplied by Fisher Body Division which makes spares sets for M-4 tanks, many man-hours of preparation are involved. Highly polished parts are dipped in a nonrust solution before wrapping to protect their surfaces, the paper wrapping being self sealing and impregnated with paraffin solution. The package then is dipped into a hot nonrust sealing solution at 170 degrees Fahr. and is crated for shipment. Test packages are subjected to severe treatments such as submersion in fresh and salt water for periods of from one to two months.

Conversion Handled Smoothly

The most recent "conversion" of various motor plants to new types of war production has been accomplished with less than anticipated difficulty and monthly increases in overall output continue. As an example of the effect of changing requirements, military vehicle production which, at the time of Pearl Harbor, constituted 52 per cent of the total automotive job, 12 months later amounted to only 29 per cent of total production and by April of this year was down to 25 per cent.

One instance of the secondary conversion jobs is the 4500-pound amphibious truck recently placed in production by Yellow Truck & Coach at Pontiac.

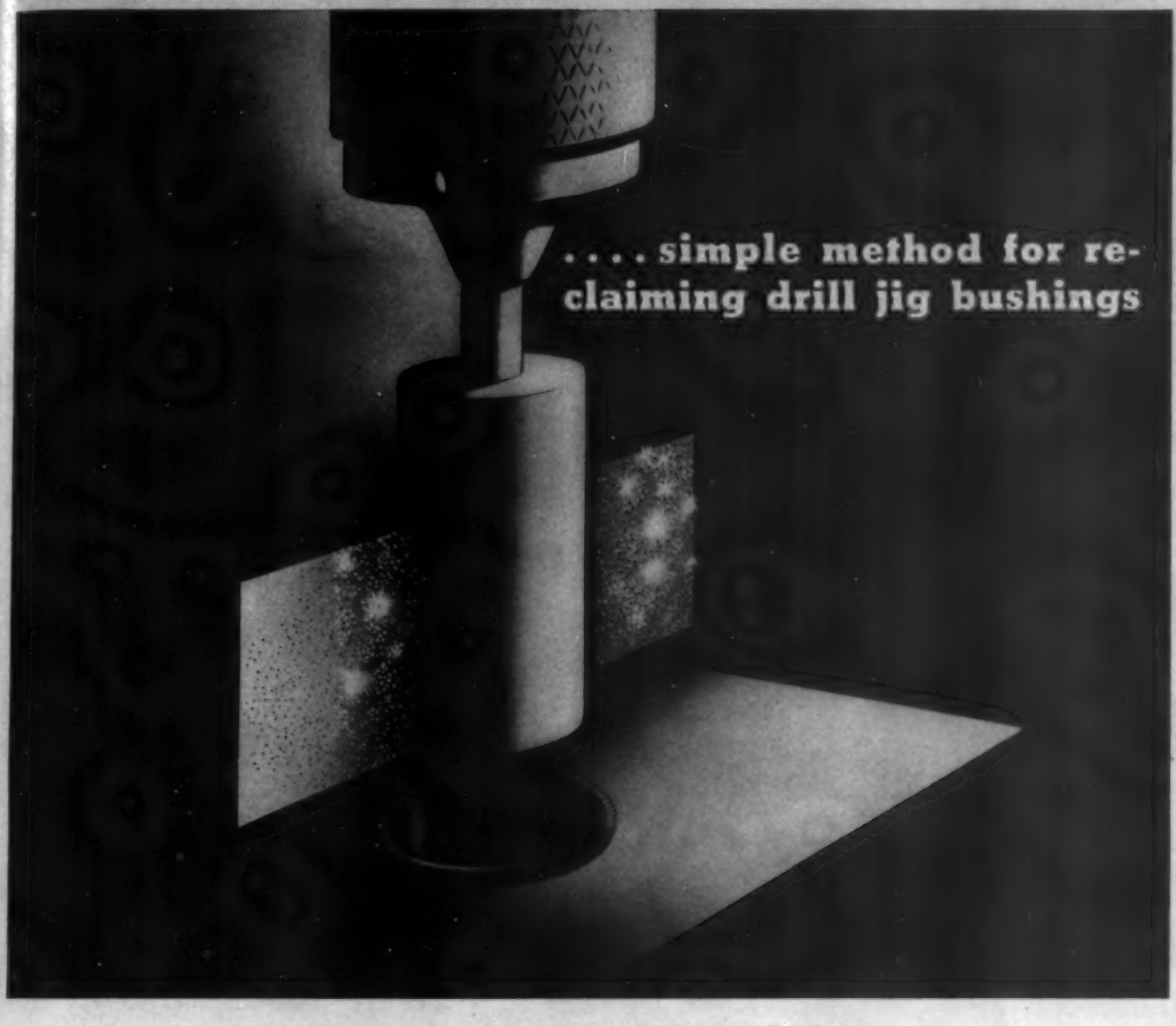
Easing of the combat tank program has resulted in one tank hull manufacturer turning to production of aircraft wings; another company, while continuing to make M-4 tanks in reduced quantities, has converted an assembly line to production of tank destroyers and is preparing its plant for work on another armored vehicle; still another, getting away from tank production altogether, is shifting over to assembly of large prime movers for the Army.

Enormity of the recent war contract cancellations is indicated by the fact that there were 3700 such terminations, out of which 2000 still are unsettled as far as final payments, disposal of inventories, etc., are concerned.

SAE Pacific Coast Groups Will Meet on Aug. 19, 20

Means and methods of maintaining wartime motor truck transportation, engineering plans for postwar air cargo development, comprise the program of the West Coast Transportation and Maintenance Meeting of the Society of Automotive Engineers scheduled for Aug. 19 and 20, Palace hotel, San Francisco.

The meeting is sponsored by SAE West Coast sections in San Francisco, Los Angeles, Seattle, and Portland, Oreg.



Information furnished by an Industrial Publication

The interior surface of drill jig bushings can be injured in several ways: by galling, burning, or seizing of the drill. In one manufacturing plant a simple but very effective method has been developed for restoring the surface by honing.

The equipment consists of a mandrel and a piece of abrasive cloth. The mandrel can be made from scrap rounds or cut-offs. The body is turned down to a diameter slightly less than that of the bushing, and the shank machined to fit into a conventional drill chuck.

The body is slotted at the bottom to take a piece of abrasive cloth somewhat wider than the depth of the bushing. The cloth is wrapped around the mandrel and the assembly started in the hole before power is applied.

If a coolant or oil lubricant is used, the bushing can be "honed" by moving the mandrel up and down as it rotates. As the hole enlarges, or as the "gall" is removed, additional pieces of abrasive cloth can be caught under the original piece to enlarge the hole still further.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

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WING TIPS

Score of the Aviation Corp. plants, dotting the map from East to West and North to South, producing vast quantities of war materiel. . . Bids fair to hold important position in manufacturing and transportation field in postwar era

KNITTING together a corporate empire in the manufacturing and transportation field, the Aviation Corp., New York, and its manufacturing units and various associated companies now dot the map of the United States from New York to San Diego, and from Detroit to New Orleans. A score of plants now are operating full tilt on war production, but eventually may be shifted to peacetime manufacturing and service.

It is pertinent to examine the spreading activities of AVCO to see how it has been progressively expanded since the days when Erret Loban Cord first began building the framework of a holding company based around Auburn-Cord automobiles, Airplane Development Corp., (later Vultee Aircraft), New York Shipbuilding, American Air Lines and some others. Cord has now departed from the scene and in the driver's seat is swarthy, good-looking Victor Emanuel who, in his reconstruction job, has had able assistance from Tom Girdler, chairman of Republic Steel Corp., and now also chairman of Consolidated Vultee Aircraft Corp., one of AVCO's associated companies.

First, let's concentrate on AVCO's manufacturing units—Lycoming, American Propeller, Republic Aircraft Products, Northern Aircraft Products and Spencer Heater.

Lycoming Oldest of Group

Lycoming is the eldest of the group, and operates three plants at Williamsport, Pa., its original plant, a new government financed plant there and a third recently occupied building in South Williamsport. The company builds radial and horizontally opposed engines for primary and advanced trainer aircraft and for liaison planes, and also has converted one of its aircraft-type engines for use in light tanks and other mobile army equipment. Last year, 84 per cent of Lycoming's output was 9-cylinder 300-horsepower radial engines to power single engine primary and navigational trainers being built by the Stinson Division of Vultee and by Boeing, and twin engine Beech, Cessna and Curtiss-Wright advance trainers. Total employment at Lyoming increased 50 per cent in 1942, one-third of them women. Lycoming is one of the old and respected names in the engine field.

American Propeller Corp. is a wholly owned subsidiary of the parent company and in June, 1942, produced its first hollow steel propeller blades in a new plant government-financed at Toledo, O. Design for the blade, produced from seamless steel tubing (STEEL, April 19, p. 92), was worked out originally by engineers of Lycoming; in fact, the first blades were built in a pilot plant at Williamsport. In January of this year, after mass output of blades at Toledo was well under way, additional machinery and equipment was purchased to facilitate a 50 per cent expansion in production at Toledo without expanding the plant. The blades are now being built in at least three different sizes.

Two Plants in Detroit

Hardened and ground precision parts for aircraft engines and propellers are the principal products of Republic Aircraft Products Division, which operates two plants in Detroit. Republic originally was an independent manufacturer organized and nurtured through its early stages by William F. Wise, a former official of Ex-Cell-O Corp., Detroit, which has been the "breeding ground" of many an able executive currently holding a high position in various branches of the metalworking industry.

Mr. Wise is now executive vice president of AVCO, but Republic is still his "baby" and he keeps a particularly watchful eye over its bounding progress. Another former Ex-Cell-O executive is Ira J. Snader, now vice president in charge of Research Development and Labor of AVCO. He was at one time an associate of Wise, and is credited with being an exceptionally keen executive.

During 1942 Republic Aircraft Products saw its production leap to 2½ times the volume for 1941 without any major expansion in floor space. To help solve a critical employment problem Republic set up an enlarged training plan for new employes, including the establishment of a training center for pre-employment training of inspectors and machine tool operators.

Supplementing work of Republic Aircraft Products is another AVCO subsidiary in Toledo, the Northern Aircraft Products Division. Announced last summer, this division has gone into production, part of its job being the supply of cutting tools to the corporation's other manufacturing units.

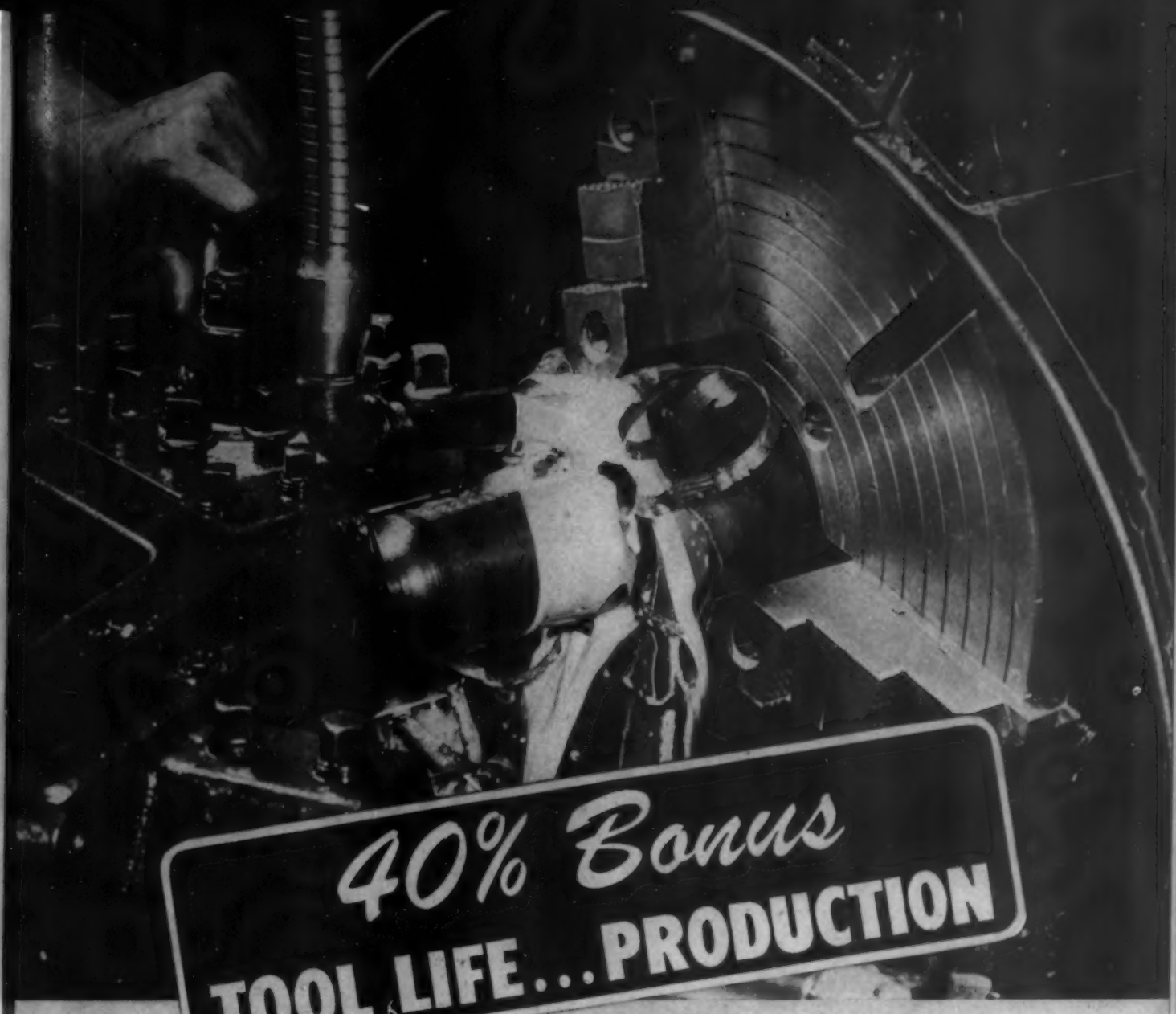
The Spencer Heater Division of AVCO operates a heavy steel fabricating shop in Williamsport, in addition to gray iron,

T. M. GIRDLER

HARRY WOODHEAD

VICTOR EMANUEL

WILLIAM F. WISE



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From metal working plants large and small on America's production front reports such as these are constantly being received. Facts that prove why the majority of metal working plants flood their tools and work with Sunoco to get more pieces between tool grinds, reduce rejects, and make every man-hour and machine-hour result in peak production. Call in a Sun Doctor of Industry, let him prove the production value of switching to Sunoco in your own plant. Write

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steel and aluminum foundries, the latter supplying castings to Lycoming. Normally Spencer built low-pressure heating boilers, but it is now converted 100 per cent to war production, including such items as boilers for war industries and army and navy projects; bulkhead, struts, hatches, deckhouses, condensers and tanks for ship construction; also gun mounts, water heaters and cradle yokes for antiaircraft guns. The gray iron foundry supplies pressure castings for valves, pumps and engines used principally on shipboard, industrial locomotive parts and machine tool parts.

Grouped Under Operating Head

This is a quick slant at the AVCO manufacturing—but it is only the beginning of an analysis of the corporation's interests. These units are grouped under one operating head, exclusive of the associated companies and other investments. They even have their own unique advertising approach, and recent issues of popular Sunday supplements of the leading newspapers have carried pages in their behalf.

Turn now to consideration of the associated companies which in themselves are so big that they almost dwarf the entire corporation. Of first importance is Consolidated Vultee Aircraft Corp., which came into being in March, 1943, when Vultee Aircraft Inc. was merged into Consolidated Aircraft Corp. AVCO owns about 30 per cent of common stock of Consolidated Vultee.

Vultee itself began in 1932 as the Airplane Development Corp., one of the original Cord properties. In April, 1936, it moved to the present location at Downey, Calif., and the name was changed to the Vultee Aircraft Division of Aviation Mfg. Corp. In November, 1939, Vultee Aircraft Inc., was organized as a separate corporation with a majority of its stock being owned by The Aviation Corp.

The following year Vultee bought the Stinson Division from AVCO, giving it aircraft manufacturing properties in Michigan and Tennessee. Harry Woodhead, previously associated with Girdler in Republic Steel, became chairman of the board of Vultee in 1940, president of Consolidated in late 1941 and is now president of the combined Consolidated Vultee, while I. M. Laddon, engineering brains of Consolidated and active with this company since 1927, is executive vice president of the combined companies.

Vultee had six divisions—the main plant at Vultee Field, Calif.; a second, Stinson, at Wayne, Mich.; a third at Nashville, Tenn.; a fourth, the former Intercontinent Aircraft Corp. at Miami, acquired in mid-1942; a fifth, a modification center, at Louisville, Ky.; and a sixth, a plant now preparing for production, at Allentown, Pa. Most of these divisions were set up during the past 18 months, following Vultee's acquisition in December, 1941 of a 34 per cent common stock interest in Consolidated Aircraft Corp. which then had a plant at San Diego. Consolidated alone had five divisions, so that now Consolidated Vultee has 11 divisions.

Named After Test Pilot

Vultee, taking its name from the famous test pilot and aviation designer, Gerard Vultee, who was killed in an airplane accident in 1938, is a pioneer in establishing mechanized assembly lines for aircraft mass production. The products of the Vultee plants include basic trainers, dive bombers and observation and liaison planes. The Louisville, Ky., operation is a "modification center" where war planes are adapted in equipment and fittings for specific theaters of action. The Allentown, Pa., plant involves the conversion of an existing structure there to the manufacture of torpedo bombers for the Navy under contracts totaling around $100,000,000. New facilities alone there will cost $11,000,000.

The Wayne, Mich., division is the original Stinson plant and has been extended considerably for production of liaison planes and navigational trainers. The Nashville, Tenn., plant originally was laid out to produce Vultee Vengeance dive bombers, production of which is now being tapered off and the plant is retooling for production of a Douglas A-20 two-engine attack bomber.

Organized By Major Fleet

Consolidated Aircraft was organized in 1923 by Maj. Reuben H. Fleet at Greenwich, R. I., it was moved to Buffalo in 1924 and to San Diego in 1935. Purchase of a substantial interest by Vultee late in 1941 meant retirement of Major Fleet as head of the company.

Consolidated designed and built the B-24 Liberator bomber and its cargo version, the C-87 Liberator Express; the Catalina two-engine flying boat for the Navy and the Coronado four-engine flying boat for the same branch of the service. It is now fitting out a new plant at New Orleans for production of a new two-engine patrol bomber for the Navy, the P4Y. Early in 1942 it started operating a vast new plant at Ft. Worth, Tex., for production of Liberators. Ford Motor Co.'s Willow Run plant and North American Aviation's Tulsa plant are also producing Liberator bombers.

Last year Consolidated opened another new division at Tucson, Ariz., as a modification center for combat craft, and still another of the same type at Elizabeth City, N. C. The two enormous plants which Consolidated operates at San Diego employed 22,000 in mid-1941, a figure which has greatly expanded in the intervening two years. Most recent addition to facilities is a seven-story reinforced concrete windowless administration building at the No. 1 plant in San Diego, housing 2000 and now the focal

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point for directing the extensive operations of Consolidated Vultee.

AVCO has a 39 per cent stake in the founders' stock of New York Shipbuilding Corp., or the equivalent of 21 per cent of total equity stock. The past year was a record one for New York Ship, whose products range from battleships to landing barges. From its yards on the Delaware river at Camden, N. J., the company delivered to the Navy the battleship SOUTH DAKOTA and five cruisers, the CLEVELAND, MONTPELIER, COLUMBIA, DENVER and SANTA FE. Three ships originally laid down as cruisers but converted into aircraft carriers, were launched during the 15 weeks between Aug. 22 and Dec. 6. Since then, up to May 24, the company launched four more ships of the same type, or a total of seven in nine months. Smaller types of craft built during 1942 totaled 148. New York Ship has been building naval and merchant vessels for 42 years.

Another associated company is American Central Mfg. Corp., Connersville, Ind., more than half of the stock owned by AVCO. This division received its first war order in March, 1941, for the fabrication of Army jeep bodies, but its toughest conversion problem was setting up to make airplane wings. Today the plant is divided roughly into two areas, one still concerned with making jeep bodies, the other given over entirely to partial fabrication and assembly of aircraft outer wings and fuselage sections. Welding equipment, riveting equipment, assembly jigs and special handling equipment and painting facilities all had to be installed in the conversion process.

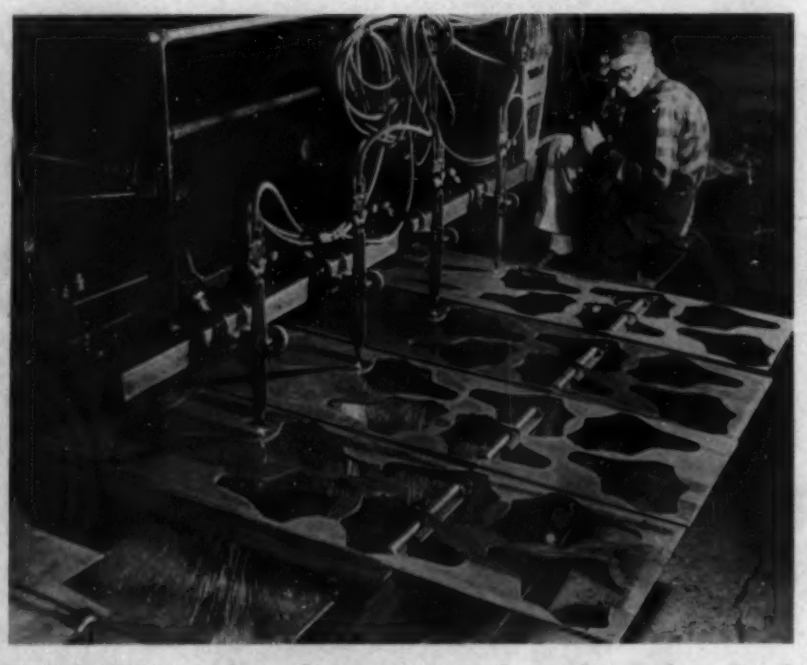
Has Other Stock Interests

This just about rounds up the operating divisions of AVCO, but it should be pointed out that the corporation also owns 25 per cent of the common stock of American Airlines Inc., 9.5 per cent of the common stock of Pan American Airways Corp., and 20 per cent of the common stock of Roosevelt Field Inc., three aces in the hole which would appear to have highly important postwar profit-making possibilities.

In summary, AVCO's own manufacturing units delivered more than $45,000,000 worth of engines, propellers, precision parts and other materials for the armed forces in 1942, while aggregate deliveries of the corporation and its associated companies amounted to more than $640,000,000. Employment of AVCO companies at the end of 1942 was approximately 120,000 and growing. Backlogs of unfilled orders for AVCO and associate companies were then better than $2,500,000,000.

AVCO's net income for the fiscal year ended Nov. 30, 1942, before provision for taxes, was $11,223,894, leaving 82 cents a share profit after knocking off $6,500,000 for taxes. And the bugbear of contract renegotiation still hangs over these figures. This income included $1,385,629 dividends from the company's investments but did not include its equity in the undistributed earnings of subsidiaries not consolidated as of Nov. 30, 1942, then comprising Consolidated and Vultee, New York Ship and American Central. This equity was equivalent to 55 cents a share of AVCO stock. AVCO's sales for the six months ended May 31, the first half of the 1943 fiscal year, amounted to $38,000,000.

If strategically located plants, astute management, facilities which may eventually be purchased from the government at attractive figures, and products which seem to have important postwar possibilities mean anything, then The Aviation Corp. bids fair to take its place alongside other leading industrial corporations of the United States.



TIME SAVER: Multiple torch cuts wing attachment fittings from ¾-inch SAE X4340 chrome-nickel-molybdenum steel plate at Long Beach, Calif., plant of Douglas Aircraft Co. Inc. A template to one side of the four torches is followed by a magnetic tracer which holds dimensions within 0.010-inch. Plates are first preheated to 900 degrees so that when they are cut under the 2800-degree torch flame the heat differential will not be so excessive at the point of contact. Two men operating the oxygraph machine can do all the handling, drilling, preheating and cutting at the rate of 4.7 minutes per piece

Aviation Supply Depot Opened at Philadelphia

A new $11,000,000 aviation supply depot, first to be devoted exclusively to storage of aviation materials, was placed in operation by the Navy at Philadelphia recently.

Covering 128 acres in northeastern Philadelphia, the depot was commissioned by Rear Admiral Milo F. Draemel, commandant of the Fourth Naval District and the Navy Yard.

Expanded Plant Facilities Make Top Use of Resources

In line with the War Production Board's policy of curtailing facility expansion and construction, non-industrial projects having a total cost of $15,338,390 have been halted in the past seven weeks. At the same time, WPB announced that the nation had completed a physical plant adequate to make the maximum use of its resources, and that in the future it would concentrate on the production of goods for the fighting fronts.

The projects halted are as follows: Roads, bridges and causeways, $10,843,963; airports, $3,871,179; gasoline facilities, $450,700; schools, $125,085; alcohol facilities, $7702; pipe line and petroleum facilities, $4761.

Overcoming Supply Shortages

Metallurgists and mining engineers breaking potential war production bottlenecks. Encouraging progress reported in battle to develop new sources and enlarge output of scarce minerals and metals

OFFICE of Production Research and Development of the War Production Board is winning the battle of materials against critical shortages that developed when the Japanese swept through the south Pacific and this country began to gear its industry for all-out war production.

Metallurgists and mineral experts have broken such potential bottlenecks as the shortage of quartz crystals by discovering new sources and rewording service specifications for radio detecting devices; they have stepped up aluminum production by further and more extensive development of low-grade, high-silica bauxite ore; they have made possible enormous quantities of magnesium from sea water, inland brine deposits, and a ferrosilicon process recovering the metal from dolomite.

Other similar and related activities have resulted in desperately needed increases in other critical materials and metals, including copper, chrome, and manganese.

OPRD Serves Vital Purposes

Organized in November, 1942, the Office of Production Research and Development is charged with the duty to "plan, direct and co-ordinate the scientific and engineering evaluation, research and development work with the WPB, in order to insure rapid appraisal and maximum effective utilization of mechanisms, materials, processes and inventions in war production; to this end to utilize as far as possible existing research personnel and facilities."

Scientists have tested and re-tested possibilities of increasing domestic supply by developing new deposits, in substituting more abundant metals in certain processes for those that are scarce, by developing low grade ores through new, laboratory-proven processes, and by lowering specifications.

Much of the work of many of America's outstanding technologists is channeled through WPB's OPRD. Their work is a two-fold task. First is to eliminate many processes or projects scientifically unsound or wasteful of materials. Second is to utilize to the utmost those processes which meet war requirements of maximum production in the shortest time, and involve minimum use of valuable equipment, labor and plant.

Result of this specialized work is that supplies of critical and strategic materials have been stepped up to such an extent that only recently officials of WPB expressed conviction that no matter how long the war lasts, the United Nations generally will have enough to meet military needs. Remarkable strides have been made in adaptation of off-grade quartz, and the flow of crystals to the Signal Corps is meeting day-to-day demands.

Half a dozen processes for stepping up aluminum production, designed to utilize high-silica bauxite, to make use of clays with heavy alumina content through a sintering process and to make use of an acid process to develop alunite deposits, have been given approval. Many scientists report that the alumina situation looks better today than it did a year ago.

Production of magnesium in 1942 was 30 times the output of 1939, and will be even higher this year, as a vast field was opened for its use in the airplane industry. Manufacture of the metal from sea water was supplemented by the use of inland brine deposits and development of a ferrosilicon process to recover magnesium from dolomite.

Fifty-six technological reports cover processes for treating low-grade manganese ores. New processes permit digging of ore with only 10 per cent content compared with the standard process calling for use of ore bearing at least 50 per cent manganese, thereby greatly increasing supply.

Vast new deposits of low-grade chrome were found in western states and one deposit in Montana has been developed to the point where it could produce more chrome concentrates than any other country in the world. To date, this could be used only by mixing it with high-grade ore but processes have been worked out to improve the grade of domestic concentrates.

TEAMWORK PAYS

The War Production Board and the War Manpower Commission joined forces last week through Clinton S. Golden, vice chairman of both agencies, to secure enough bricklayers to prevent threatened loss of 36,000 tons of steel production.

Great Lakes Steel Corp. blew out a blast furnace near Detroit for relining and enlargement. The contractor, however, could only obtain 14 experienced bricklayers and 20 more were needed if a 15-day delay in completion of the job with consequent loss of 36,000 tons of steel production was to be avoided.

The Steel Division, WPB, notified Golden of the situation. He conferred with Harry Bates, president, International Bricklayers Union and very shortly the needed bricklayers were rounded up.

Issues Report on Methods Of Analyzing Tungsten Ores

Bureau of Mines has published a report on methods of analyzing tungsten ores, particularly those from low-grade deposits. The report describes in detail three methods proven in the Bureau's laboratory at Salt Lake City. They are the standard cinchonine method, tannic acid-anti-pyrine method, and a third method combining the first two.

The combination method was found most suitable for all types of low-grade tungsten ores and now is in use at the laboratory. Its advantages are that time required for analysis is less, amount of cinchonine needed is reduced, and the final precipitation of tungsten invariably is complete. A procedure of recovering the cinchonine, a reagent not readily available, also is outlined.

North Range Mining Co. Opens Its Fourth Mine

North Range Mining Co., 3600 Book building, Detroit, has started production of iron ore from Book mine at Alpha, Iron county, Mich. Output in the 1943 season is expected to be 350,000 gross tons. The Book mine was acquired by lease from the Oliver Iron Mining Co. in 1942 and stripping operations started last fall. This mine was explored in 1914. Ore is standard old-range non-bessemer type.

Operations at first will be open-pit but eventually it will be developed as an underground project, probably in 1944. North Range Mining Co. now has four properties in the Lake Superior district, Blueberry, Mary Charlotte, Schley and Book.

MEN of INDUSTRY

Walter L. Cherry, president, Cherry-Burrell Corp., Chicago, has resigned, effective Oct. 15, to become chairman of the executive committee. **S. B. Berg,** secretary and comptroller, and **J. L. McIntyre,** treasurer, have been elected to the executive committee.

—o—

C. O. Wanvig Jr., Wyeth Allen and **J. Fletcher Harper** were named to the board of directors, Globe Union Inc., Milwaukee. **William Wanvig** was elected secretary of the company, succeeding **W. B. Fyffe,** now in service, and **C. J. Ehrendreich** was made secretary-treasurer to succeed Mr. Wanvig.

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Albert V. Dolan has been elected chief engineer, Ft. Pitt Bridge Works, Pittsburgh, succeeding the late Charles G. Schade.

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Frank Cordes has been elected president and general manager, Pittsburgh Steel Foundry Corp., Glassport, Pa., following his resignation as board chairman, Blaw-Knox Co., Pittsburgh.

—o—

Z. G. Taylor has been named manager, East Cleveland (Ohio) Lamp Works, General Electric Co. Mr. Taylor succeeds **W. B. Gillen,** who has become manager of manufacturing for General Electric's new Tube Division of the Electronics Department. Mr. Gillen will be responsible for tube manufacturing activities at Buffalo, Cleveland, Lynn, Mass., and Schenectady, N. Y.

—o—

William P. Witherow, president and director, Blaw-Knox Co., Pittsburgh, and **William C. Frye,** former president of Chain Belt Co., Milwaukee, director of Interstate Drop Forge Co., Milwaukee, and other companies, have been elected

EUGENE P. HARTER

Who has been made general sales manager, Electro Refractories & Alloys Corp., Buffalo, as reported in STEEL, July 26, p. 56.

J. GUY GRIFFITH

ALFRED MARCHEV

to the board of trustees, Northwestern Mutual Life Insurance Co., Milwaukee.

—o—

J. Guy Griffith, president, J. Guy Griffith Co., Pittsburgh, has been appointed Pittsburgh representative of Wapakoneta Machine Co., Wapakoneta, O., succeeding the late **Joseph E. Fawell.**

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E. A. Renfer, manager of the Sycamore (Ill.) plant, Anaconda Wire & Cable Co., has been appointed manager of the Marion, Ind., plant also, succeeding **Frank E. Hart,** who has been transferred to the Chicago sales office.

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Marvin S. Bandoli, formerly general sales manager, Victor Adding Machine Co., Chicago, has been elected vice president.

—o—

John B. Barry has been appointed vice president, Designers For Industry Inc., Cleveland.

—o—

Matthew R. Rosse has been appointed sales manager, export division, Wickwire Spencer Steel Co., New York.

—o—

Philip Schane Jr., formerly chief metallurgist, Duquesne Works, Carnegie-Illinois Steel Corp., has been appointed chief process metallurgist of the company's Pittsburgh district metallurgical division.

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Wallace P. Cohoe, consulting chemist and engineer, has been elected president of the Society of Chemical Industry, London, England.

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F. W. Waterman Jr. has been appointed forecast engineer, Carnegie-Illinois Steel Corp., Pittsburgh.

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Fred M. Young, president and general manager, Young Radiator Co., Racine, Wis., has been appointed vice president and member of the board, Western Metals Specialty Mfg. Co., Milwaukee.

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Alfred Marchev has been elected president, Republic Aviation Corp., Farmingdale, N. Y., succeeding **Ralph S. Damon,** resigned.

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John C. Veller has joined the Chicago district sales office, Inland Steel Co., Chicago.

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Arthur M. Penhallow has been appointed controller, Osborn Mfg. Co., Cleveland.

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Fred H. Wilhelm has been appointed chief draftsman and assistant to the chief engineer, Thew Shovel Co., Lorain, O.

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E. J. Krause has been named assistant director of service on war products for Buick Motor Co., Flint, Mich.

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M. L. Doelman has been made Buffalo district representative for Modern Equipment Co., Port Washington, Wis. Mr. Doelman is located at 66 Russell avenue, in Buffalo.

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J. M. Tucker, formerly vice president and general sales manager, Oliver Farm Equipment Co., Chicago, has been appointed assistant to the vice president and general manager, Massey-Harris Co., Racine, Wis.

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Hugo A. Weissbrodt has resigned as deputy director in charge of the production service division, War Production Board, Detroit, to return to International Harvester Co. for special war work at Chicago headquarters.

—o—

Edward I. White, former vice president, McCann Furnace Co., Cleveland,

has been elected president and treasurer to succeed **Harry F. McCann,** who died June 7. Other officers elected were: **Charles Iten,** vice president; **C. H. Myers,** secretary and general manager; and **Charles Lynch,** chief engineer.

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George Greeley, formerly secretary of the trust department, First National Bank, Oshkosh, Wis., has been appointed assistant secretary, Wisconsin division, Timken-Detroit Axle Co.

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T. C. Carlsen has been appointed superintendent of parts manufacture, Rockwell plant, Bell & Howell Co., Chicago.

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Charles Hummel has been elected comptroller of Bendix Aviation Corp., South Bend, Ind., to succeed **W. H. Houghton,** who recently was elected treasurer of the company.

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John P. Argyle, vice president, Vierding Steel Works, Chicago, celebrated his eighty-first birthday July 22.

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George R. Murray, works manager, Chambersburg Engineering Co., Chambersburg, Pa., and **Edgar S. Hutton,** treasurer of the company, have been elected vice presidents. Mr. Hutton has been elected a director as well.

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William E. Lynn has been appointed general sales manager in charge of both domestic and export operations, Standard Cap & Seal Corp., New York. Mr. Lynn has been affiliated with the export shipping department of International

DEWEY C. HARVEY

Who has been named chief plant engineer, Osborn Mfg. Co., Cleveland, noted in STEEL, July 26, p. 56.

HARVEY McKENNEY

Who has been appointed manager of alloy steel sales, Follansbee Steel Corp., Pittsburgh, as reported in STEEL, July 26, p. 56.

Railways of Central America, and also has served as sales director, American Isteg Steel Corp., which was taken over by Wickwire Spencer Steel Co., New York.

—o—

Frank L. Wright, formerly chief metallurgist, Norma-Hoffman Bearings Corp., Stamford, Conn., has been named manager of research. **Warren D. Anderson** has been appointed assistant chief engineer for the company.

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R. S. Reynolds, president of Reynolds Metals Co., Richmond, Va., has been elected chairman of the board, Richmond Radiator Co., Uniontown, Pa. **Henry L. Charlton,** vice president and director, Reynolds Metals Co., was named president of Richmond Radiator Co., and H. J. McMenimen Jr. was elected vice president and member of the board.

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Clyde Wyman, previously works manager, Oklahoma Steel Casting Co., Tulsa, Okla., has been appointed chief metallurgist, Burnside Steel Foundry Co., Chicago.

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J. S. Longdon, sales manager, and **Frank J. Schwab,** factory equipment manager, Lempco Products Inc., Bedford, O., have been named vice presidents.

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Victor H. Mantz has been appointed assistant to the secretary and treasurer, Allegheny Ludlum Steel Corp., Pittsburgh. Mr. Mantz will be located at the company's Brackenridge, Pa., offices.

OBITUARIES . . .

George A. Gallinger, 64, vice president, Ingersoll-Rand Co., New York, died in Cape Vincent, N. Y., recently. Mr. Gallinger joined the pneumatic tool division, Ingersoll-Rand Co., 35 years ago.

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Charles Earl, 74, vice president and general counsel, American Smelting & Refining Co., New York, died recently in Great Neck, L. I.

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F. A. Pope, president, Cleveland Liner Mfg. Co., Cleveland, died recently in that city.

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Frank R. Scofield, 84, retired president of the former Lake Erie Iron Co., Cleveland, died in that city July 26.

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G. A. Marr, 77, veteran secretary of the Lake Carriers' Association, Cleveland, died there July 23. Mr. Marr's career covered the history of shipping on the Great Lakes for the past 49 years.

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Frank M. Young, for 19 years a sales representative in Milwaukee for Dodge Mfg. Co., Mishawaka, Ind., died recently in Milwaukee.

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Ben E. Swingley, a partner in the Wedd Fire Fighting Equipment Co., Toledo, O., died in that city recently.

—o—

Albert C. Lerman, president, Union Chain & Mfg. Co., Sandusky, O., died there recently.

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Edgar F. Collins, 69, retired consulting engineer, General Electric Co., Schenectady, N. Y., died recently in Round Lake, N. Y.

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H. W. Grant, 73, vice president of the Struthers Iron & Steel Co., Struthers, O., and founder and retired president of the City Trust and Savings Bank of Youngstown, O., died recently in Youngstown.

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G. W. Long, 51, vice president, Simmons Machine Tool Corp., Albany, N. Y., and a member of that company for more than 30 years, died July 22 at Lake George, N. Y.

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M. W. McConkey, 52, patent counsel, Bendix Products Co., South Bend, Ind., and president, Hydraulic Brake Co., Detroit, died recently in South Bend.

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William L. Latta, 68, manager of the galvanized sheet sales division, Wheeling Steel Corp., Wheeling, W. Va., died July 24 in that city.

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Clem H. Chuse, 63, secretary, Elliott & Barry Engineering Co., St. Louis, died recently in that city.

Industry must provide jobs for an estimated 56 million persons when Johnny comes marching home from the war

Industry Must Prepare To Shoulder Tremendous Task

Reconversion from wartime to peacetime production necessitates planning now before guns of war have been silenced. . . Huge expansion of physical plant, technological advances, shifts in population and markets intensify transition problem

J. C. SULLIVAN
Assistant Editor, STEEL

THE DAY Johnny comes marching home again, this country will face the most difficult industrial readjustment period in its history.

Relationships among regions, among industries and among units within industries will be influenced by the way the adjustment is made.

Transition to civilian goods production will create difficult problems attending employment of the then estimated working force of 56 million persons available in the agricultural, service and industrial groups. That a high level of activity of the nation's sharply expanded industrial facilities must be maintained is clear. And the tremendous task in prospect of providing employment for 56 million persons is indicated by the fact just prior to the war there were only 46 million employed.

The war effort has resulted in the greatest increase in manufacturing plant facilities ever experienced. At the same time technological advances have been made which put a new face on the problem of competition.

The cost of war plant expansion roughly is estimated at half the investment made in manufacturing facilities from 1920 through 1940. The enormous increase in production of certain basic commodities and metals is shown by the wartime peak capacity estimates recently made by the National Industrial Conference Board.

Foresee Vast Ingot Tonnage

For instance, production of alloy steel ingots and castings, which totaled 4,966,000 net tons in 1940, is expected to reach a peak of about 16 million tons this year. Steel ingot capacity at the close of this year will amount to about 96 million tons with production for the year totaling 92 million tons, against 67 million in 1940.

Aluminum ingot production capacity was only about 300 million pounds at the beginning of 1939. It is expected to reach a war time peak of more than 2 billion pounds. Magnesium output of 13 million pounds in 1940 will seem small indeed, compared with ultimate wartime capacity of between 600 and 725 million pounds.

Other basic metal industries, notably copper and lead, have also been expanded. Production of these metals is limited only to the extent of mine output.

Newly created synthetic rubber industry is scheduled to reach an annual capacity of about 1,100,000 tons by 1944.

When peak war production is attained the aircraft industry's output will be between thirty and forty billion dollars annually, in sharp contrast with 1939 value of $280 million.

Total ship tonnage built in 1939 of 342,000 tons is dwarfed by that scheduled for this year, close to 20 million tons.

With termination of hostilities, huge volume of industrial capital will be frozen in partly finished work, and partly processed parts and materials. Some estimates run as high as $100 billion worth of unfinished war contracts. Prompt and equitable termination of war contracts will aid industry to obtain the funds necessary to meet reconversion costs, pay rolls, and bills for new materials and supplies.

Manufacturers have gone far deeper in debt for plant expansion and working capital during this conflict than they did in World War I. Few industries have sufficient surplus to carry them through any prolonged waiting period of war contract settlement as experienced after the

last war. Taxes and contract renegotiations have sharply restricted the funds set aside for future use.

Quick disposal of government owned facilities, unfinished products and materials will aid in hastening the plant reconversion and will have an important bearing on competitive relationships within civilian goods fields.

The problem of conversion from a war to a peace economy involves far more than readjusting operating equipment.

Many war plants can be quickly adapted to manufacturing civilian products but geographical location of some presents serious handicaps to their use. Location of many plants has been dictated by considerations of defense, or the availability during the war boom of scarce production factors such as labor or electric power.

Conversion to any large scale manufacturing operations in some instances may be handicapped by the absence of related manufacturing production and specialized marketing services. Yet for certain types of consumer goods and factory supplies, there may be important new markets arising from the rapid local growth of industry in general. It is not at all improbable that situations of this type are likely to be found in California and the Texas Gulfcoast after the war.

Government owned plants to be disposed of are of two types: Those on which private industry has certain options to purchase at the termination of hostilities and those on which there is no such option. In the second group are many of the strictly military type facilities such as smokeless powder and shell loading and certain basic metal producing units, especially in the aluminum and magnesium field. Most of the strictly military facilities have been permanently built and are expected to be held for future use if necessary.

The government appears to have the following choices in the liquidation of these strictly military facilities:

(1) Sale to present managers on terms similar to those granted others under Defense Plant Corp. contracts.

(2) Sale or management contract with a private management not now in the field for the purpose of stimulating competition.

(3) Sale to present managers with special provisions to insure fair price and marketing policies and maintenance of full productive capacity.

(4) Continuation of present government ownership and private management.

(5) Government ownership and operation.

Must Avoid "Ghost" Towns

Some war plants have required the development of entire new communities, which face the danger of becoming "ghost" towns unless some substitute civilian activity can be provided. The problem is not entirely one of being able to get into actual production on a certain product. It also involves the question whether the product can compete effectively in the open market, because of high operating costs and the manpower problem in those areas distant from large population centers.

Volume and character of industrial output in the postwar period seem likely to be affected by the amount of postponed consumer demand which can be translated into actual purchases; extent of our export trade which ties in with the degree of the responsibility the nation assumes for reconstructing devastated war areas; volume of military supplies needed to meet international obligations; and progress made in new product development.

Extent of the deferred demand in the postwar period is expected to be tremendous. In consumers' durable goods alone accumulated shortages are seen reaching an estimated total of $12 billion. Other estimates include $3 billion for construction and equipment; for deferred maintenance, $2.8; public works and maintenance, $2.6; and for consumers' nondurable goods an additional $2.5 billion—totaling $22.9 billion.

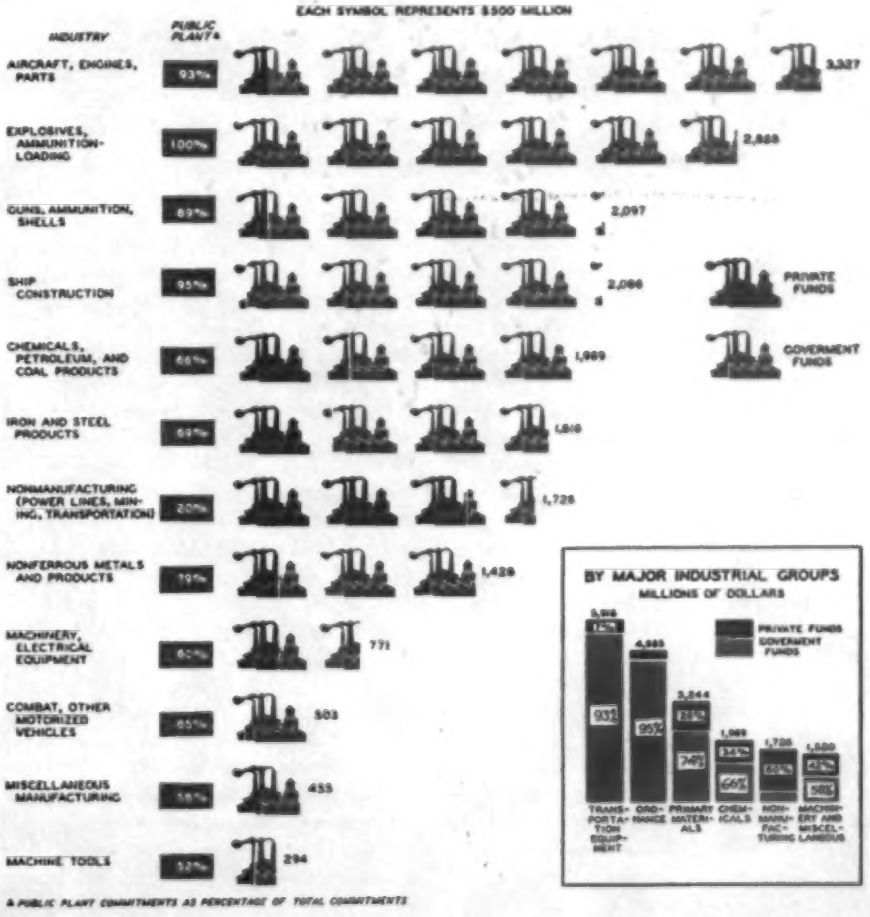
Company postwar committees are being urged by the government to begin now to make studies along the following general lines, so as to best determine the position of their companies and that of their industries in the postwar era.

(1) Estimate postwar productive capacity of their plants, of their industry and that of their competitors, and of industry as a whole.

(2) Analyze business conditions following previous wars, particularly World War I, in an effort to see what happened to their own and similar industries.

(3) Research should be made in determining the growth of different industries—their probable output and re-

(*Please turn to page* 146)



With virtually all projects placed, total cost of new war plants and equipment from June, 1940, through March, 1943, is estimated at $19.3 billions, of which 78.3 per cent will be met from public funds. Shaded areas represent government proportion. Source: National Industrial Conference Board

Government Spokesmen Warn of Losses Due to Lagging Schedules

Marked stepup in output necessary in closing months of 1943 if assigned quotas are to be attained, states General Somervell. In some items armed forces are not yet fully equipped

CHICAGO

THAT war material production is lagging so far behind schedule that it fails to match military needs, and may prolong the war, were "sobering and unpleasant" facts revealed to Chicago business men a week ago by two well informed government spokesmen.

At the same time they warned of the grave consequences if over-optimism and industrial strife continue to hamper output for the armed forces.

The two spokesmen were Lt. Gen. Brehon Somervell, chief, Army Service Forces, and C. E. Wilson, executive vice chairman, WPB, who addressed a War Production luncheon, July 23, sponsored by the Chicago Association of Commerce, and attended by 1500.

General Somervell emphasized that to meet assigned quotas of production for this year, 61 per cent of the airplanes scheduled must be built in the last six months; 59.6 per cent of the ordnance; 67.9 per cent of signal corps equipment; 65.1 per cent of engineer equipment; and 68.9 per cent of chemical warfare needs. He listed only quartermaster and medical supply production as up to schedule.

"Armed Forces Not Fully Equipped"

"In some fields our Army has its initial equipment and its future requirements will be for battle losses," the general explained. "However, in the majority of items, we are still not fully equipped. It will be well into 1944 before our troops here and abroad will have equipment both for operations and for training.

"We are building up a large army overseas. We have already shipped more tonnage to North Africa than was shipped for the United States to the A.E.F. in France in the last war."

He recalled that the output of needed equipment was $300,000,000 behind schedule for the Army in April, May and June. To make up the deficit, General Somervell said, production must be greatly stepped up in the last half of the year, at least to the extent of $100,000,000 a month. This would be a great help to early victory, while delay would contribute to losses.

Mr. Wilson pointed out that the June production goal was 6½ billion dollars and 6 billion was realized. This, he said, was a "sobering fact", and its truth could not be changed by impressive figures on total output. "As long as war output is short of requirements, we have every cause for worry."

The WPB executives stated that one of the most serious obstacles to the war effort is industrial disputes and disturbances.

The speaker praised the patriotic cooperation shown by managers and labor in more than 2000 of the nation's largest war plants and credited labor-management committees with dealing vigorously and effectively with many difficult problems arising in war plants.

"Whatever reasons may be cited to account for the slackening in the rate of war production," Mr. Wilson concluded, "they are not acceptable reasons. There can be no acceptable reasons in such circumstances."

RENEGOTIATION ACCELERATED

War Department Price Adjustment Board reports written or verbal settlements reached with 713 contractors in four weeks ended June 19, 43 per cent as many as in preceding 13 months

The rate of renegotiation of war contracts by the War Department Price Adjustment Board is being substantially accelerated. In the four weeks ending June 19, 1943, written or verbal settlements were reached with 713 war contractors, or 43 per cent as many as the 1658 cases settled in the period of almost 13 months from April 28, 1942 to May 22, 1943.

During May of this year, renegotiations conducted in the War Department by contracting officers and the price adjustment agencies resulted in commitments for elimination of excessive profits in an estimated amount of $247,000,000. This brought the total to an estimated amount of $2,113,000,000. Of this amount, $895,000,000 represents the recovery of excessive profits realized and $1,218,000,000 represents price reduction for future deliveries.

These readjustments include those made by contracting officers on prime contracts and by War Department price adjustment agencies on deliveries reviewed by them both totaling $20,600,000,000. One of the prime influences of the renegotiation statute has been on the pricing of new contracts, but this influence is not even approximately measurable and no estimate is included in the reported total of reductions obtained.

As of June 19, a total of 10,741 contracting companies had been assigned for renegotiation by the War Department Price Adjustment Board. Settlements of 2371 represent 22 per cent of this total, while an additional 4567 or 42 per cent were then engaged in renegotiation. It is estimated that the total number of war contractors subject to renegotiation by the War Department is approximately 15,000.

Small Plants Receive 75% Of Quartermaster Contracts

Small war plants are receiving about 75 per cent of all prime contracts awarded by the Quartermaster Corps, the War Department announces. In addition, small war plants hold about 80 per cent of all Quartermaster Corps subcontracts.

Survey of contracts awarded during January, 1943, showed that 48 per cent went to firms employing less than 100 wage earners and another 26 per cent went to concerns employing from 100 to 500 wage earners, leaving only 26 per cent for companies with more than 500 employes.

This is not a new departure for the Quartermaster Corps, which pioneered in contract distribution among smaller concerns. An analysis of contract awards for 1941 and 1942 discloses that twice as many prime contracts and four times as many subcontracts were held by small war plants as by large plants.

Small war plants received twice as many Quartermaster contracts as plants employing more than 500 in the last two months of 1942.

A branch Quartermaster Corps contract renegotiation unit has been established at 521 Fifth avenue, New York.

Brazil Industry Needs Studied

Feasibility of Installing Machine-Rebuilding Plant at Sao Paulo Being Surveyed by C. A. Simmons

BRAZIL, industrially the fastest-growing nation of South America, has been in urgent need of capital equipment since the outbreak of the war. Its leading industrial city, Sao Paulo, is experiencing unemployment during a boom period because its plant machinery is wearing out, with no chance of replacement due to the overwhelming demands for such machinery by the United States and its Allies.

As first step toward helping correct this situation, Brazil is investigating possibilities for establishing a machinery-rebuilding plant in that country. Such a program could be expected to relieve lend-lease demand, thus easing the war production schedule of the United States and its Allies.

Charles A. Simmons Sr., president, the Simmons Machine Tool Corp., Albany, N. Y., and a widely known authority on machine-tool practice, left this country by clipper last month for a ten-week South American trip during which he will visit Brazil and other Latin American republics. Survey for a rebuilding plant in Brazil is an important feature of his agenda, but Mr. Simmons will also serve in an advisory capacity for the United States Navy, inspecting arsenals and machine shops at bases in Brazil and elsewhere.

When the defense program was initiated in 1940, Mr. Simmons was chosen to head up the Available Tools Section of the Office of Production Management, later named the War Production Board. He next served in a similar capacity for the Navy's Bureau of Ships, and altogether has spent two and a half years in Washington in an advisory capacity. During his absence the Simmons Machine Tool Corp. continues operation under the management of Charles A. Simmons Jr., vice president and general manager.

Before leaving for Brazil Mr. Simmons was tendered a testimonial dinner by his associates in the Bureau of Ships. Among those who paid tribute to his work were: Capt. Lyle F. Small, U.S.N., assistant chief, Shipbuilding Division; Capt. E. R. Henning, U.S.N., Army-Navy Munitions Board; Capt. R. E. W. Harrison, Bureau of Ships; Col. Haviland Wright, Army Ordnance Department; Howard W. Dunbar, general manager, Norton Co., Worcester, Mass., and former member of the WPB Tools Section; Frederick W. McIntyre, general manager, Reed-Prentice Corp., Worcester, Mass., who recently returned from Australia as a member of the Lend-Lease Mission.

Charles A. Simmons Sr., president, Simmons Machine Tool Corp., Albany, N. Y., was guest at a testimonial banquet before taking Clipper to Brazil recently to survey that nation's machine-tool needs. Capt. E. R. Henning, Army-Navy Munitions Board, shakes hands with Mr. Simmons as Capt. Lyle F. Small, assistant head, Shipbuilding Division, awaits his turn

Contracts for 125 Vessels Placed with 12 Shipyards

Awards for construction of approximately 125 vessels for various federal agencies were announced recently. Types of ships to be built include steel tugs, wooden tugs, cargo vessels, escort aircraft carriers, barges, and derrick lighters

Contracting companies and orders received are as follows:

Standard Shipbuilding Corp., San Pedro, Calif.: seven 150-foot ocean tugs for U. S. Maritime Commission. Hillstrom Shipbuilding Co., North Bend, Oreg.: two diesel-powered wooden tugs for Navy. Klepp Marine Ways, Rainier, Wash.: 204-foot wooden cargo vessel, to cost $321,000, for Army Transport Corps.

Port Houston Iron Works, Houston, Tex.: 34 diesel-powered 45-foot steel tugs and four 74-foot steel diesel tugs for Army. Sturgeon Bay Shipbuilding & Dry Dock Co., Sturgeon Bay, Wis.: 14 diesel 176-foot cargo vessels for Army. D. W. Nicholson Corp., San Leandro, Calif.: number of vessels for Army Transport Service to cost more than $1,000,000.

Seattle-Tacoma Shipbuilding Corp., Seattle, Wash.: escort aircraft carriers for Navy. J. K. Welding Co., Brooklyn, N. Y.: 11 steel tugs, with 400 horsepower diesel engines, for Army Transportation Corps, and 12 cargo boats of 176-foot length for Army. Marietta Mfg. Co., Point Pleasant, W. Va.: 8 diesel 140-foot seagoing tugs for Army Quartermaster Corps.

Spedden Shipbuilding Co., Baltimore: small cargo vessel with 650-horsepower diesel engine for Army Transportation Corps. Levingston Shipbuilding Co., Orange, Tex.: four 143-foot tugs with 1500-horsepower diesel-electric engines; four 173-foot barges, and two 125-foot self-propelled derrick lighters, all for War Department.

Allen Boat Co., Harvey, Ill.: eight 74-foot tugs powered by 400-horsepower engines, for War Department. Iron Fireman Mfg. Co., Cleveland: 207 triple-expansion marine steam engines for installation in Liberty ships, for Maritime Commission.

Copper-Brazing Furnace Installed in South

An electric roller hearth copper-brazing furnace has been installed in the record time of one month in the Dallas, Tex., plant of Universal Corp. This furnace, needed quickly to meet deadlines on a chemical warfare product, is the first copper-brazing furnace to be installed south of the Mason-Dixon line. Installation was made by General Electric Co. engineers working night and day with Universal Corp. mechanics.

Demobilization Extent Surveyed

Michigan, Connecticut, Washington, Indiana Face Most Severe Situation, Official Estimates Indicate

MICHIGAN, Connecticut, Washington, and Indiana will face the most serious postwar employment situation among all the states when the armed forces and war-production workers have been demobilized, according to estimates just completed by the United States Bureau of Labor Statistics.

Their estimated ratios of demobilized ex-servicemen or war workers for each 100 men employed in the same states in 1940 are: Michigan, 58.5; Connecticut, 48.7; Washington, 45.2; Indiana, 45.0.

The next eight states, confronting a somewhat less severe problem, are: California, 42.0; Maryland, 42.0; Ohio, 40.4; New Jersey, 38.8; Pennsylvania, 37.7; Kansas, 37.6; Utah, 36.1; Rhode Island, 35.6.

In a group of 17 states the effects of demobilization will be much lighter, either because each state had little war industry or because its prewar level of peacetime employment was high. These states are: Delaware, 34.3; Oregon, 33.1; Massachusetts, 31.9; Illinois, 31.8; Wisconsin, 31.4; Maine, 30.2; West Virginia, 30.2; Alabama, 29.2; Oklahoma, 29.1; Virginia, 28.7; New York, 28.4; Missouri, 27.4; New Hampshire, 27.4; Colorado, 26.6; Louisiana, 26.6; Texas, 26.4; Tennessee, 24.7.

The estimates are based upon four assumptions (not predictions): That the war will be ended on all continents by December, 1944, at the peak of the war-production effort. That the United States will maintain 2,500,000 men under arms during early postwar years. That war production will be speedily curtailed to the level of postwar defense needs. That industrial reconversion and expansion to high levels of civilian production will proceed rapidly, with no delays from financial difficulties or uncertainty of markets. Other figures used in computing the estimates are: Demobilized servicemen, 8,500,000; released workers, slightly over 6,000,000.

Sam Tour & Co. Operating Their Own Laboratories

The metallurgical laboratories established by Sam Tour during the 14 years he has been vice president and chemical and metallurgical engineer in charge of the engineering department of Lucius Pitkin, Inc., located at 45 Fulton street, New York, since June 30 have been operated as the laboratories of Sam Tour & Co. Inc.

Lucius Pitkin, Inc., continues as before as analysts, assayers, chemists, consultants, spectroscopists, weighers and samplers, and shippers representatives catering to the mining and metallurgical industries.

Main office of Lucius Pitkin, Inc. continues at 47 Fulton street, New York.

Tam Tour & Co. have taken over the work as consultants, engineers, metallurgists, radiographers, research development and testing laboratories for the clients previously served by the discontinued department of Lucius Pitkin, Inc.

Sam Tour & Co.'s main offices are at 65 Pine street, New York, and its laboratories are at 45 Fulton street. It specializes in the metallurgical, chemical and process engineering fields.

Reports First Drop in Industrial War Employment

Industrial employment declined an estimated 100,000 during May, according to the National Industrial Conference Board, this being the first drop in such employment since the outbreak of the war. Including as employed, men added to the armed forces, however, a new employment peak was attained during the month of 62,400,000 persons.

Fully 7,000,000 more persons were at work or in uniform during May than in the same month of 1942.

Share-the-Plant Drive Launched by WPB

WPB has launched a "share-the-plant" movement to get maximum arms output with a minimum of new additional plant construction. This is a part of the board's broad program designed to hold down further expansion of industrial factories and their equipment while at the same time seeing that all the army and navy requirements are met.

The program calls for quick conversion of plants, left idle as a result of changing armament needs.

They Say:

"The several (federal) departments are under the obligation of administering the renegotiation law, and the possibility of amendment does not in any way affect the duty of either department or the contractors to continue renegotiation under existing law."—Under Secretary of Navy **James V. Forrestal** and Acting Secretary of War **Robert P. Patterson,** in joint statement July 25.

* * *

"There should be a meeting of a few wise and courageous men, representatives of management, finance, farmers, of industrial employes, who would discuss as solemnly as did the men who drew our national Constitution, or the Declaration of Independence, the steps necessary to make our free-enterprise system operate for the security and happiness of all."—**Charles E. Wilson,** vice chairman, War Production Board, and former president, General Electric Co., in an interview at Washington July 24.

* * *

"Production must not be interrupted anywhere for a single precious minute, for our minutes are measured in blood. . . . Every American who places the security and welfare of his nation above all other considerations is perfectly aware that there can be no excuse in the slightest for any work stoppage caused by a strike."—**Eric A. Johnston,** president, Chamber of Commerce of the United States, in a July 24 radio address.

* * *

"An undue amount of absenteeism among workers in war-production plants was reported over July 4 and could be attributed only to overconfidence. There have been other reports of essential workers looking around for what they call 'permanent jobs after the war,' as though their war jobs were about over. That is a serious mistake."—**Robert P. Patterson,** Acting Secretary of War, speaking at Chicago on July 24.

* * *

"When we as victors lay down our arms in this struggle against the enslavement of the mind and soul of the human family, we take up arms immediately in the great war against starvation, unemployment, and the rigging of the markets of the world."—**Vice President Henry A. Wallace** in a speech at Detroit, July 25.

In recognition of outstanding production, Admiral Emory S. Land presented (left) the United States Maritime "M" award to the Air Reduction Co. Inc., Bethlehem, Pa., at a colorful ceremony recently. Left to right, Admiral Land, W. J. Strawn, employe representative, C. S. Munson, company president, and C. E. Adams, company chairman, are shown

Industrial Firms Cited by Army, Navy

Additional metalworking companies cited to receive the Army-Navy "E" awards for outstanding war production recently include:

Freeport Sulphur Co., Port Sulphur, La. and Freeport, Tex.
Hannifin Mfg. Co., Chicago.
Hercules Powder Co., Hercules, Calif.
Johns-Manville Products Corp., Lompoc, Calif.
Multiplex Mfg. Co., Berwick, Pa.
Orange Screen Co., Maplewood, N. J.
Springfield Buick Co., Springfield, Mass.
Taylor Instrument Co., Rochester, N. Y.
Worthington Mower Co., Stroudsburg, Pa.
L. A. Young Spring & Wire Corp., Trenton, N. J.
Zollner Machine Works, Ft. Wayne, Ind.
Cannon Electric Development Co., Los Angeles.
Difco Laboratories Inc., Detroit.
Industrial Metal Fabricators Inc., Chicago.
Metro Tool & Gage Co., Chicago.
National Carbon Co. Inc., Niagara Falls, N. Y.
Phoenix Tool & Mfg. Co., Chicago.
Republic Aviation Corp., Long Island, N. Y.
Sloan Valve Co., Chicago.
Wiremold Co., West Hartford, Conn.
J. D. Adams Mfg. Co., Indianapolis.
Aeronca Aircraft Corp., Middletown, O.
Ajax Flexible Coupling Co., Westfield, N. Y.
American Type Founders Inc., C. H. Cowdrey Machine Works Division, Fitchburg, Mass.
Baker Oil Tools Inc., Los Angeles.
Bendix Aviation Corp., Towson, Md.
Detroit Harvester Co., Dura Division, Toledo, O.
C. B. Gentry Co., Gilroy, Calif.
The Heil Co., Milwaukee.
Jackson-Evans Mfg. Co., Omaha, Nebr.
Silas Mason Co., Shreveport, La.
Smith, Drum & Co., Philadelphia.
Tennessee Copper Co., Copperhill, Tenn.
United Electronics Co., Newark, N. J.

Mrs. Anna Roosevelt Boettiger and Capt. Charles J. D'Hooghe of the Western Gear Work's auxiliary military police unit, Seattle, Wash., display (left) the Army Guidon awarded the company at a recent ceremony

These women welders (below) receive the United States Maritime Commission's "M" award for production for their co-workers at the Union Metal Mfg. Co., Canton, O.

THE BUSINESS TREND

War Output Expanding Despite Many Handicaps

MIRRORING in part cessation of the coal strike and intensification of efforts to overcome the recent lag in war goods production, latest weekly business barometers indicate moderate upturn in industrial activity is under way. This contrasts with the slight downward tendency of production during June and early July.

Overall production is edging higher despite the difficulties in manufacture attending war program changes dictated by shifting needs at the fighting fronts. These revisions have resulted in complete plant shutdowns in a few instances, and production schedules of many other manufacturers have been delayed by design changes.

Absenteeism, general manpower shortage and scarcity of raw materials are additional factors hindering war output schedules from attaining the month-to-month gains hoped for earlier this year. Growing "complacency" also is a factor checkmating expansion, but at the same time it is recognized that as production mounts toward the peak it becomes increasingly more difficult to attain projected schedules.

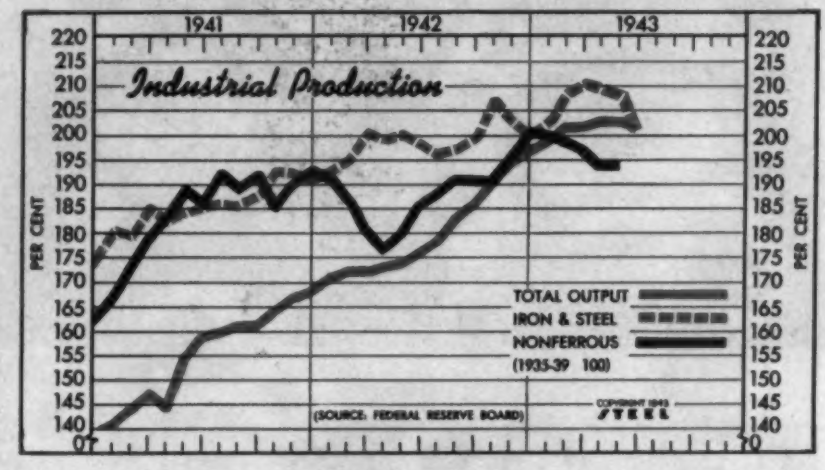
Military requirements for 1943 call for a steady monthly increase in output of war material during the closing months of the year to a rate 50 per cent greater than that in the first six months, Charles E. Wilson, executive vice chairman, WPB states. Government officials still are hopeful the projected schedule will be achieved.

ORDER CUTBACKS—War contract cancellations and order cutbacks, although still relatively light in relation to total contracts on manufacturers' books, are estimated to have already totaled more than cancellations at the close of World War I. Appointment by WPB of several independent committees to review Army and Navy requirements and to compare them with munition inventories may lead to additional cancellations or trimming of war contracts in the near future.

Policy recently developed by the War department to minimize effects of contract cutbacks or cancellations on plant employes provides that the War Manpower Commission be informed of the changes so that agency may arrange for re-employment of displaced workmen.

JUNE PRODUCTION—Federal Reserve Board's seasonally adjusted index of industrial production declined slightly during June from the peak May level. The June figure of 201 was the lowest recorded since last January, but remained 14 per cent above a year ago. Sharp drop in coal output during the month and a temporary curtailment in the production of coke, pig iron and steel offset a moderate increase in operating schedules at plants producing war products in the chemical, rubber and transportation equipment industries.

Finished aircraft production, in terms of airframe weight, was up three per cent in June, while delivery of supplies for the Army ground forces rose one per cent.



Federal Reserve Board's Production Indicies

	Total Production		Iron, Steel		Non-ferrous	
	1943	1942	1943	1942	1943	1942
Jan.	199	171	203	192	200	191
Feb.	202	172	208	194	199	187
Mar.	202	172	210	200	192	181
Apr.	203	173	209	199	194	177
May	203	174	208	200	194	180
June	201	176	201	198	194	186

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	98.0	97.0	98.5	98.5
Electric Power Distributed (million kilowatt hours)	4,196	4,184	4,120	3,626
Bituminous Coal Production (daily av.—1000 tons)	1,983	1,850	2,025	1,857
Petroleum Production (daily av.—1000 bbls.)	4,119	4,103	3,954	3,601
Construction Volume (ENR—unit $1,000,000)	49.0	104.0	53.7	148.2
Automobile and Truck Output (Ward's—number units)	20,130	19,485	19,185	18,260

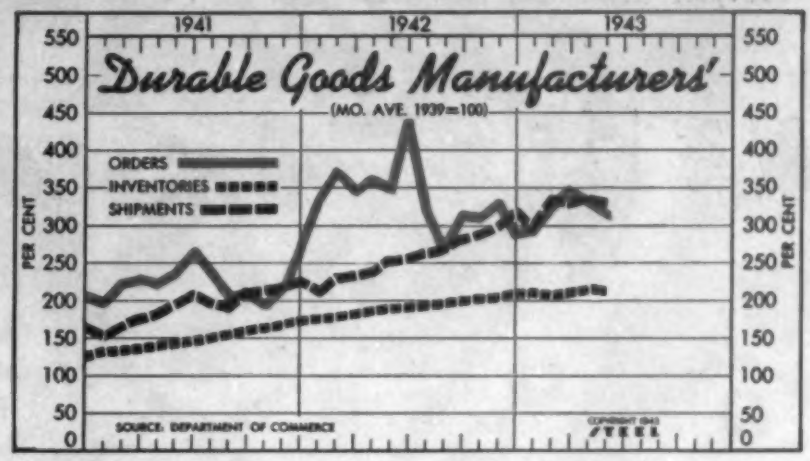
*Dates on request.

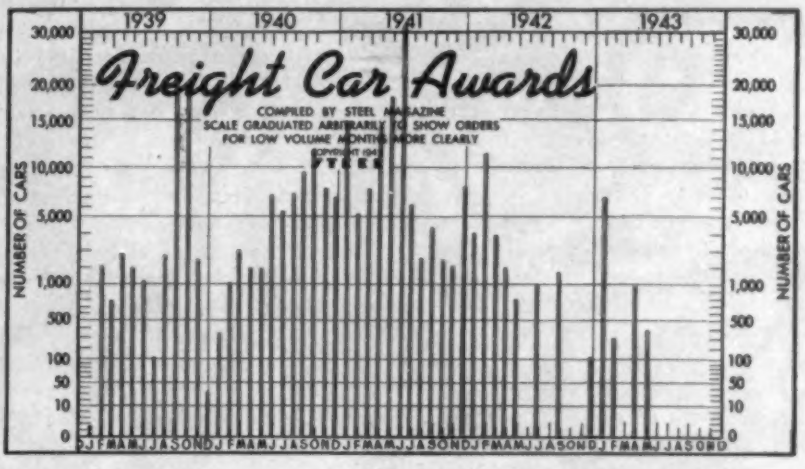
TRADE				
Freight Carloadings (unit—1000 cars)	890†	877	761	856
Business Failures (Dun & Bradstreet, number)	50	48	60	190
Money in Circulation (in millions of dollars)‡	$17,706	$17,658	$17,154	$12,546
Department Store Sales (change from like wk. a year ago)‡	−1%	+40%	+29%	+10%

†Preliminary. ‡Federal Reserve Board.

Manufacturers Durable Goods

	Orders		Shipments		Inventories	
	1943	1942	1943	1942	1943	1942
Jan.	293.5	333.9	298	214	211.3	179.2
Feb.	326.6	373.4	337	232	209.6	180.8
Mar.	349.2	344.4	330	235	210.7	183.4
Apr.	329.8	362.1	338	239	213.5	186.6
May	316.1	348.4	335	254	212.7	190.2
June	.....	439.5	...	256	.....	193.2
July	.....	321.8	...	264	.....	195.8
Aug.	.....	269.4	...	270	.....	198.0
Sept.	.....	314.5	...	283	.....	200.9
Oct.	.....	312.1	...	289	.....	204.1
Nov.	.....	334.7	...	300	.....	207.7
Dec.	.....	291.1	...	320	.....	210.1
Ave.	.....	337.1	...	263	.....	194.2



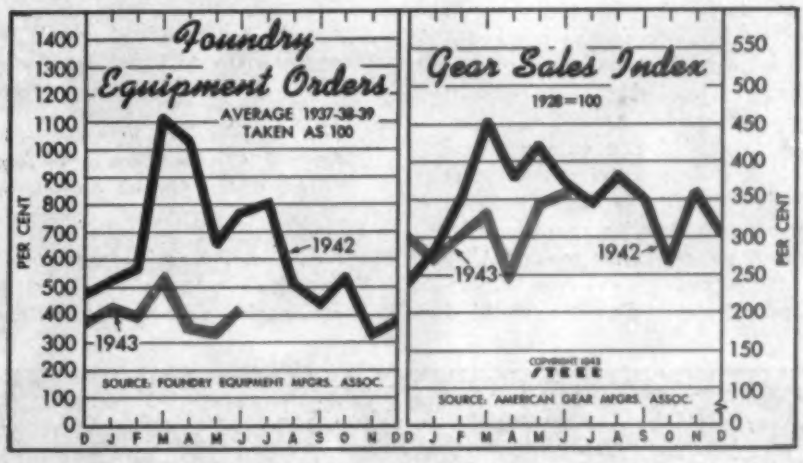


Freight Car Awards

	1943	1942	1941	1940
Jan.	7,415	4,253	15,169	360
Feb.	350	11,725	5,508	1,147
March	0	4,080	8,074	3,104
April	1,000	2,125	14,645	2,077
May	0	822	18,630	2,010
June	0	0	32,749	7,475
6 mos.	9,135	23,005	94,745	16,173
July	.....	1,025	6,459	5,846
Aug.	.....	0	2,668	7,525
Sept.	.....	1,863	4,470	9,735
Oct.	.....	0	2,499	12,195
Nov.	.....	0	2,222	8,234
Dec.	.....	135	8,406	7,181
Total	.....	26,028	121,499	66,889

Foundry Equipment and Gear Sales

	Monthly Average (1937-38-39=100)		—Index— (1928=100)	
	1943	1942	1943	1942
Jan.	429.8	532.7	268	288
Feb.	399.5	567.9	303	353
Mar.	562.7	1122.4	334	455
Apr.	362.7	1089.3	240	378
May	348.9	653.6	342	421
June	413.6	774.0	359	373
July	.....	800.8	...	344
Aug.	.....	510.8	...	380
Sept.	.....	446.4	...	351
Oct.	.....	540.6	...	263
Nov.	.....	338.8	...	359
Dec.	.....	382.5	...	300
Year	.....	646.7 Ave.	...	355



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—billions)	$8,612	$8,906	$9,058	$7,269
Federal Gross Debt (billions)	$144.4	$144.1	$139.7	$80.9
Bond Volume, NYSE (millions)	$61.8	$63.7	$52.4	$27.0
Stock Sales, NYSE (thousands)	4,714	6,788	4,672	1,644
Loans and Investments (millions)†	$46,822	$45,563	$49,965	$33,338
United States Government Obligations Held (millions)†	$32,287	$31,095	$32,364	$17,068

†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$56.73	$56.73	$56.73	$56.73
Spot Commodity Index (Moody's, 15 items)†	244.2	242.1	244.1	231.2
Industrial Raw Materials (Bureau of Labor index)‡	114.0	114.0	114.8	99.8
Manufactured Products (Bureau of Labor index)‡	99.6	99.7	100.7	96.9

†1931 = 100; Friday series. ‡1926 = 100.

User Report No. 16 on Experience with . . . .

NE (National Emergency) ALLOY STEELS

NE Steel Castings vs. Forgings

By AL ZWALD
Chief Engineer
Willamette Hyster Co.
Portland, Ore.

DUE to suddenly increased production demands on one of our larger size hoists, we were faced with an apparent shortage of alloy steel forgings for transmission gears.

Overcrowded production schedules of the manufacturer regularly supplying us with these forgings didn't seem to allow him to meet this extra demand in time to fill our production requirements. Time was too short to make new dies and place orders with another forge shop. We therefore decided to investigate the possibility of using alloy steel castings to fill the possible gap until a new supply of forgings was on hand.

A local electric steel foundry was consulted. Its management and metallurgical staff agreed to experiment with casting these gear blanks of an alloy steel similar in chemical composition to NE-9437. To do this required making a special heat as no alloys with satisfactory chemical analysis were regularly produced.

A total of five gears were involved with four being distinctly different in shape. Weights varied from 25 to 65 pounds each, totaling approximately 270 pounds per set in the rough. All were to be cut to three-quarter stub tooth form. Outside diameter varied from approximately 6 to 9½ inches and face widths from 1½ to 2¼ inches. They were to be heated and oil quenched after machining and then drawn to a hardness of 48 to 54 rockwell C.

The maximum static unit stress on the teeth of the smallest gear is 60,000 pounds as determined by the Lewis formula using a speed factor of 600 divided by (600 + v). Under normal conditions this stress would only be approximately about 5 per cent of the unit's operating time. On over 200 machines in the field that have operated continuously under severe working conditions in redwood, fir and other logging operations, no gear failures have been reported.

Gear steels previously used in these machines with equally successful results were SAE-4140, 4340 and 3140.

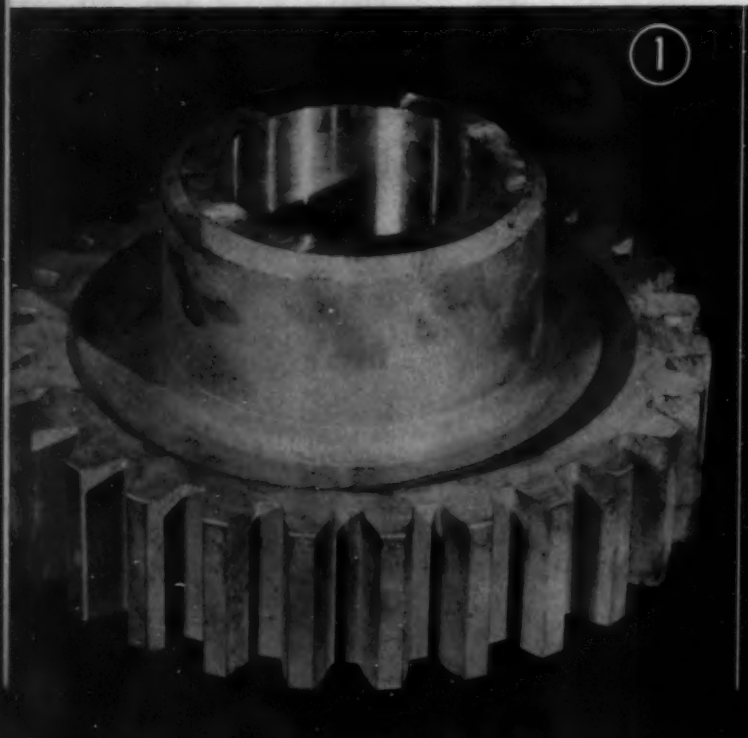
To establish a practical foundry procedure for obtaining flawless homogeneous-castings, these gears were re-designed, making sections as uniform as possible.

Fig. 1—Photo of gear "C" taken in approximately the same position as the radiograph shown in Fig. 2. Outside diameter is 9½ inches, face is 2¼ inches, ¾ stub teeth

Fig. 2—Radiograph of gear "C" shown in Fig. 1. Note oil hole from gear root diameter to hub hole; also outline of dental clutch machined inside hub on lower face

Fig. 3—Gear "D" shown in approximately the same position as radiograph figure 4. Outside diameter of large side is 9.166 inches; face 1 13/16 inches; ¾ stub teeth. Outside diameter of small side is 7.833 inches; face 1½ inches; ¾-inch stub teeth

Fig. 4—Radiograph of gear in Fig. 3. Note shrinkage area (approximately ¾-inch diameter) about ½-inch below identification letter "D". Gear is cast steel made for experimental purposes to determine best possible foundry practice



Special pattern equipment was made and experimented with to get a high grade product. The most difficult job was a bevel pinion 6 inches outside diameter cast integral with the drive shaft which was 2¾ outside diameter by 14 inches long (finish sizes). A fully cored mold was used for this part. The other four were cast in dried sand molds. Gates and risers were made large to insure proper feeding of hot metal and eliminate shrinking faults.

Experimental castings were then made using a somewhat lower grade of alloy steel regularly made at this foundry. These were machined complete and heat treated to check their soundness and obtain an approximate comparison of hardening ability and size growth due to heat treatment.

Radiographic examination for possible internal flaws showed a shrinkage area just below the root diameter on the large size of the cluster gear. Larger risers corrected this on subsequent castings. No internal flaws were found in the four remaining parts.

Enough data had thus been gained to warrant making up a heat of the special alloy steel intended for these gears. The capacity of the first electric furnace used was 2½ tons. Due to the large risers, the proportion in weight of castings produced to hot metal poured was 45 per cent.

The chemical analysis of this heat checked as follows: Carbon 0.39, manganese 1.04, sulphur 0.048, phosphorus 0.04, nickel 0.54, chromium 0.49, molybdenum 0.28.

Cloverleaf type test bars cast and heat treated in approximately 1¼-inch squares and rounds were used in machining tensile and impact test bars. The physical properties obtained are shown in Table I when the work was quenched in water from 1550 degrees Fahr. and drawn, as indicated, 4 hours.

These compare quite favorably with available figures from an eastern rolling mill on one heat of NE-9442 steel which checked as follows: Carbon 0.40, manganese 1.18, silicon 0.24, nickel 0.40, chromium 0.40, molybdenum 0.18.

After quenching in oil from 1510 degrees Fahr. and tempering at 1100 degrees Fahr., physical property tests of 1¼-inch square specimens showed a tensile strength of 141,000 pounds per square inch, yield-point of 126,500 pounds per square inch, elongation of 18.5 per cent, reduction in area of 57.3 per cent, hard-

(*Please turn to Page* 130)

For information on development of NE steels and their properties, see STEEL, Feb. 9, 1942, p. 70; March 16, p. 72; June 8, p. 66; June 15, p. 66; July 13, p. 80; July 20, p. 86; Aug. 3, p. 70; Aug. 17, p. 40; Aug. 31, p. 41 and 76; Sept. 7, p. 78; Oct. 19, p. 66; Nov. 9, p. 96; Dec. 28, p. 27; Jan. 25, 1943, p. 84; Feb. 22, p. 102; March 1, p. 94; March 8, p. 90; March 22, p. 78; March 29, p. 76; April 5, p. 116 and 118.

For reports from users of NE steels, see Nov. 16, 1942, p. 106; Nov. 23, p. 90; Nov. 30, p. 62; Dec. 7, p. 112; Dec. 14, p. 99; Dec. 21, p. 70; Jan. 11, 1943, p. 60; Jan. 18, p. 66; Feb. 1, p. 100; March 8, p. 109; March 15, p. 96; March 29, p. 72; April 26, p. 84; June 7, p. 106; June 14, p. 98; June 21, p. 92; July 26, p. 88.

For latest revised listing of NE ALLOY steels, see March 8, 1943, p. 90.

For details of WD (War Department) steels and complete listing, see Feb. 8, 1943, p. 80.

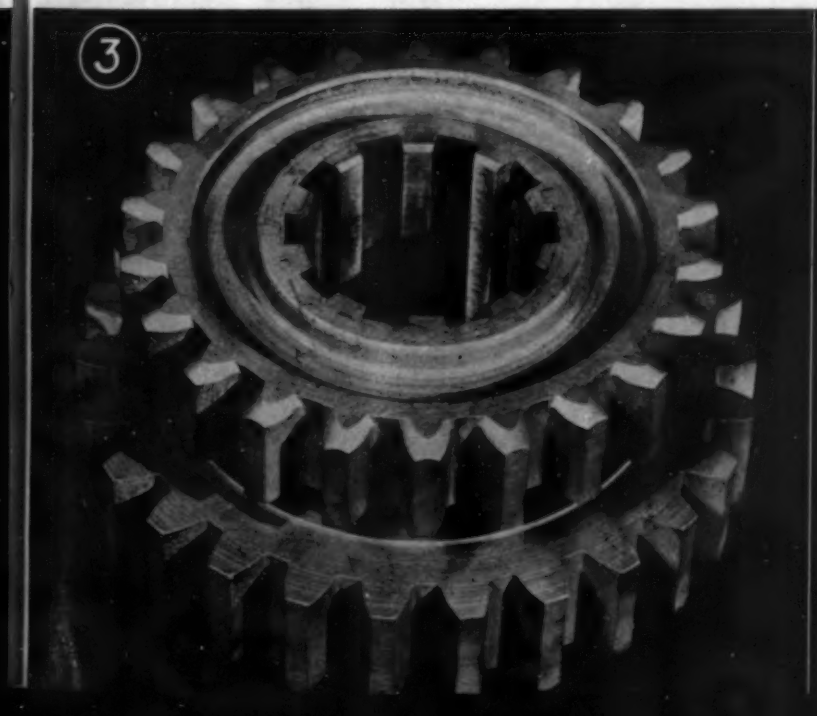
For STEEL's latest *Handbook on NE Steels* and the *NE Steel Selector*, address Readers' Service department, Penton building, Cleveland. Price $1.00 per set.

TABLE I—Physical Properties of Cast NE-9437

Draw Temp. Degree F.	Tensile Strength P.S.I.	Yield Point P.S.I.	% Elong. In 2"	% Red. of Area	Brinell Hardness	Izod Impact
800	180800	167950	6.5	10	293	13.5-14-13.5
900	164900	144750	10.5	15	277	19.5-20-20
1000	147900	131750	13.5	30	262	25-25.5-25.5
1100	140000	122250	17	33	248	35-35.5-34.5
1200	117350	100200	21.5	39	228	47-48-47
1300	110600	92850	23	46	207	50.5-50-49

TABLE II—Results of Tension Tests

Specimen No.	Tensile Strength P.S.I.	Yield Point P.S.I.	% Elong.	% Red.	Brinell
1	171000	164000	8	14	340
2	163250	154000	12.5	22.4	340
3	165600	158000	12.5	26.5	332



GUN

By ARTHUR F. MACCONOCHIE
Head, Department of Mechanical Engineering
University of Virginia
University Station, Va.
And
Contributing Editor, STEEL

THREE HUNDRED years ago last Christmas, a three-pound infant made his entry into the world and trembled for some hours on the brink of eternity. Such a common event would have no particular significance for us now, but for the fact that the boy was destined to give clear expression to Galileo's thinking about motion and so to become the founder of a system of mechanics. In particular, he established a relation amongst force, mass and acceleration which enables us to predict the effects on gun mount and ship structure, when naval shells leave on their mission.

Perhaps the sharpest impression we have of the nature of force arrives via the muscles of the body, and anyone who has fired a shoulder arm is aware—and, in the case of a novice, sometimes painfully aware—of the rearward thrust of the butt when the gun is fired. This rearward movement of the gun is termed "recoil" and the distance the gun travels is known as the "length of the recoil".

If gun and projectile were out in space, remote from any gravitational field and were perfectly free to move, on firing, the shell would move in a straight line in one direction and the barrel along the same axial line in the opposite direction. Neglecting, for the moment, the existence of the powder charge, we observe that the pressure producing motion of the projectile, is exactly equal at all times to the force accelerating the gun and acts over the same interval of time. Hence the final velocities of projectile and gun would be inversely proportional to their masses, and both would continue to move indefinitely until other forces changed their state. If, in practice, a gun is so mounted as to be free to move in a horizontal direction (the influence of gravity being thereby eliminated) we speak of the movement as "free recoil".

The effect of the powder charge (both burned and unburned) being now considered, we note that the same principle will hold and, the resistance of the air in the barrel being neglected, the momentum of the gun will be equal to the sum of the momenta of the projectile and charge, so long as the several parts of the system are associated.

It should also be observed that the velocity of the shell and the velocity of the charge are not equal, the assumption commonly made being that the velocity of the center of mass of the latter is one-half that of the shell. While this relationship enables us to determine the velocity of free recoil at the instant the shell leaves the gun, the continuing expansion of the gases increases the rearward velocity of the gun by some 40 to 45 per cent.

In all cases of free recoil, no force whatsoever is transmitted to the mount, but eventually, of course, the gun must be brought to rest and returned to its "in-battery" position. If, on the other hand, no provision were made for recoil, the full force of the rearward thrust of the explosion, less the friction between shell and barrel, would be transmitted by the mount to the ship's structure, necessitating extremely heavy and cumbersome arrangements entirely unsuited to use aboard ship and not well adapted to land service, since this thrust may amount to several thousand tons in the case of large caliber guns.

Clearly some compromise is in order, which will take account of the ability of the ship's structure to bear recoil thrust and of the practical limitations on barbette dimensions. In the case of minor caliber weapons of high elevation, the longer the recoil, the higher must be the trunnions in order that the breech may clear the deck. Thus the large guns of the battleship recoil through a length of only three calibers (caliber refers to diameter of gun bore), while those of the destroyer, with its lighter structure, require a length of six or more calibers.

Assuming that the resistance to recoil is to be constant throughout the rearward movement of the gun, our next concern is with some type of brake which will maintain this resistance constant and transform the work done against it into heat. In considering this problem, it will be apparent that the device must have a high capacity for absorbing heat and hence a liquid brake is the obvious choice. But the liquid selected will have to have a low freezing point and preferably a fairly constant viscosity over a wide range of temperature. Certain oils, and mixtures of glycerine and water meet these specifications quite well.

If, further, work is to be absorbed by causing liquid flow through orifices, we must know rather precisely the characteristics of the motion of recoil, in order that the area of these orifices may be varied in such wise that the resistance to flow remains sensibly constant. At the commencement of the stroke the velocity of the recoiling gun is zero. It then rises, reaches a maximum and, if the brake has been correctly designed, diminishes smoothly to zero at the limit of recoil.

Thus a full knowledge of the pressure

Fig. 1. (Left)—Merchantmen use this type gun. Slide in which gun moves in recoil and counter-recoil is cylindrical steel casting, fitted with bronze front and rear liners. Beneath slide may be seen circular brackets which support recoil and counter-recoil cylinders. Elevating arc and pinion are also visible. Gear train driving elevating pinion embodies friction disks that prevent injury to operator when gun jumps

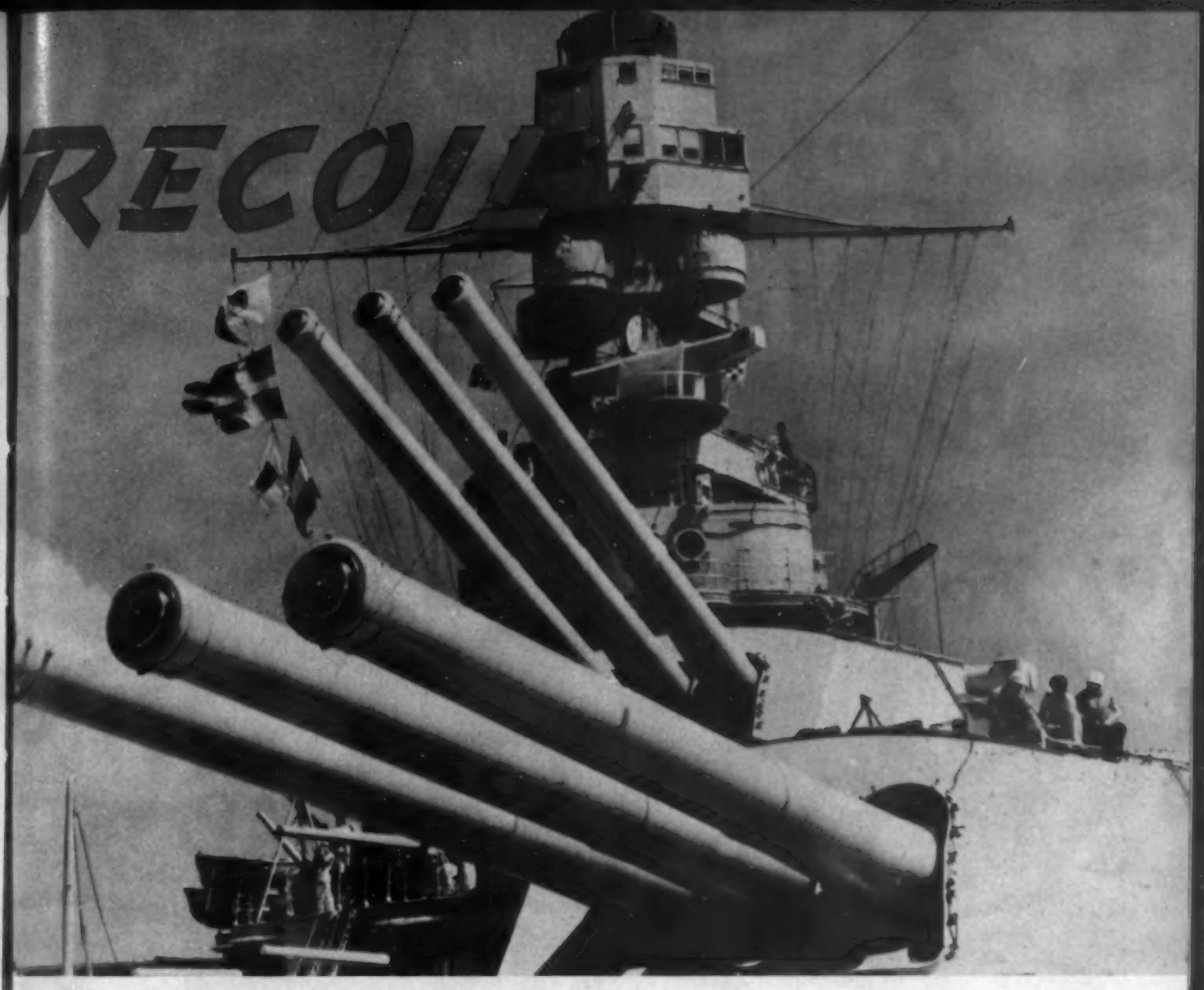
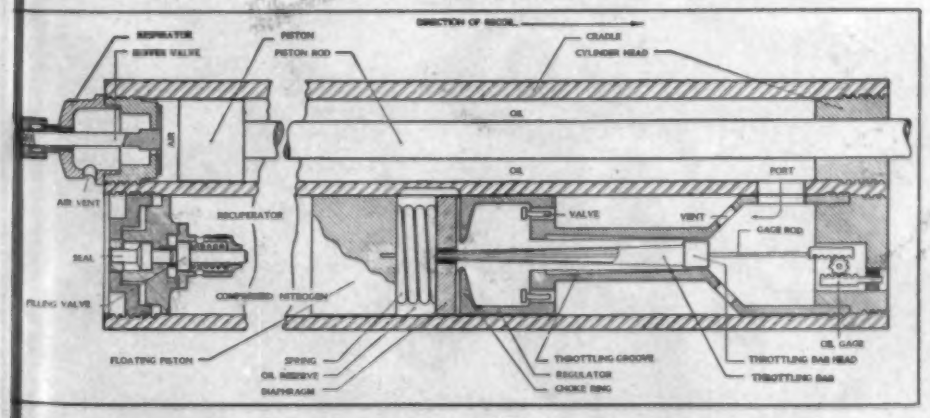


Fig. 2. (Above)—The six forward guns of the U. S. S. PENNSYLVANIA are fitted with the type of hydro-pneumatic system described in the text. Two cylinders are used per gun and are mounted on top of the slide. Air pressure is maintained at 1800 pounds per square inch, rising to about 2700 at point of maximum travel during recoil. Ships with similar guns may use other recoil systems. Six 14-inch guns on the main forward battery of U.S.S. CALIFORNIA, for instance, use spring-pneumatic counter-recoil system, consisting of four tubes, two above slide and two below, with recoil cylinder below and between lower pair of tubes. End of piston is fastened to lug on gun yoke, while cylinder is mounted on slide. During recoil, air and spring are compressed, assisting return to battery positions. Official U. S. Navy photos

Fig. 3. (Below)—Recoil system for French 75-millimeter gun. Courtesy John Wiley & Sons



neutralizing the inertia force acting on the shell and the way in which this varies, together with the frictional forces opposing recoil, the extent of the gravity component and the thrust of the counter-recoil mechanism will be essential.

Among the other dynamical considerations which govern the design of the recoil brake is the necessity for centering the line of action of the resistance as nearly as possible on the axis of the gun barrel. This is necessary in order to diminish the "jump" of the gun between the instant of decision to fire and the moment the shell leaves the muzzle. Anyone who has fired a submachine gun is aware of the tendency to "climb." This is readily interpreted if we consider the system of forces acting on the gun and note that the force producing recoil and the resistance provided by the body of the operator, are not, in general, directly opposed but form a couple tending to raise the muzzle.

The same effect is noticeable in the case of a pistol, except that in semi-automatic fire, an opportunity is afforded to bring the sights back on the target. (But it should not be inferred from this

that "jump" appreciably impairs the accuracy of small arms fire, since the angular movement between the squeeze on the trigger and the departure of the bullet is extremely small, the greater part of the upward rotation of the barrel taking place after the bullet has left the gun).

So far as the requirements of recoil are concerned, these may be met by the use of a piston-cylinder arrangement, the cylinder being usually mounted on the slide and the piston moving with the gun. Traversing each recoil cylinder from one end to the other are two or three rods of variable diameter which pass through holes in the piston. Thus, as the action proceeds, each annular orifice increases as the velocity of recoil increases and diminishes in the latter part of the stroke as the rearward movement of the gun subsides. This end can also be attained by cutting grooves of variable width in the wall of the recoil cylinder but perhaps less advantageously since, if the action is not satisfactory, another set of rods may readily be substituted while, in the case of grooves, adjustment is less easily made.

For a previous description of recoil mechanisms, see STEEL, July 28, 1941, p. 52.

If all of the energy of the recoil stroke were transformed into heat, none would be available for returning the gun to battery. Hence some provision in the form of coil springs, compressed air, liquid pressure, or the like must be made in order that a portion of this energy may be stored during the recoil stroke. Coupled with this major function, counter-recoil mechanisms must be capable of holding the gun in battery in readiness to fire.

In the simplest arrangement a series of springs in pairs (one within the other) may be incorporated in the recoil cylinder, but more often the counter-recoil elements are separate units. Springs have the disadvantage of being subject to breakage and permanent set, while air tends to leak past packings and must be constantly replenished.

This latter difficulty may be overcome by packing of special design, incorporating a ring of opposed U-leathers, between which liquid is introduced at a pressure which is always in excess of the air pressure in the counter-recoil cylinder. This is rather ingeniously accomplished by means of a separate differential cylinder, whose plunger is driven by air supplied by the counter-recoil cylinders. Since the packing is always kept moist and there is a greater tendency for liquid to leak in rather than for air to leak out, pressures of the order of 1800 pounds per square inch may be used in the counter-recoil cylinders—a figure which may rise during recoil to half as much again. Two such counter-recoil cylinders are commonly used per gun, the cylinders being secured to the slide and the plungers moving with the gun.

The French Seventy-Five

The recoil system of the famous 75-millimeter French field gun merits particular notice. This was mounted in the gun cradle, a forging, through which two long holes were bored. In the upper, a piston and piston rod were mounted, the latter being attached to the gun lug. See diagram Fig. 3. In action, the recoiling gun drew the piston to the rear, forcing oil from the upper to the lower cylinder through a large port. Within the lower cylinder, a light forging in the form of a hollow double ended piston with reduced connecting section, was mounted.

The oil flowed into the breech end of this hollow forging and thence through vents into the annular space between the central section and the wall of the lower (recuperator) cylinder.

By way of non-return valves, it next found its way into the other hollow end and escaped by way of the annular space between the "throttling bar" and the choke ring, as shown in Fig. 3. The pressure of the oil forced the diaphragm forward, compressing the spring and thus further compressing the nitrogen in the muzzle end of the recuperator to some 3400 pounds per square inch. Thus the energy of recoil was largely dissipated in overcoming the resistance to the flow of oil and in compressing the nitrogen. As the action proceeded, the throttling bar gradually increased this resistance by reducing the area of the annular space between choke ring and bar, thus bringing the moving parts gently to rest at the limit of recoil.

During the return stroke, the valves seated, leaving the throttling grooves surrounding the throttling bar as the only means of escape for the oil. These grooves were so designed as finally to close this avenue entirely, thus returning the gun to the firing position with a minimum of shock, a process assisted by air, escaping slowly through one or more vents in the buffer valve mounted in the forward end of the upper cylinder.

A consideration of this excellent design will indicate that the nitrogen leakage must have been practically nil. Should oil leak, it will be apparent that the floating piston will move breechward, pushing the gage rod and causing withdrawal of the gage.

Duplicate Specification Sheets Simplify Orders

All dimensions, fittings, etc. for single and double sling chains are easily and accurately recorded for orders and estimates on duplicate specification sheets, such as those developed by S. G. Taylor Chain Co., Hammond, Ind.

The forms provide simple drawings with spaces for fill-ins, and are made in duplicate, one each for purchaser and salesman. Details of measurement and fitting are quickly covered, eliminating misunderstanding and errors.

Fig. 4—The Bofors 40-millimeter twin-mount anti-aircraft gun. These guns characteristically have a wedge-type breech block which is automatically opened and locked. Device is rigidly installed on gun, can be continuously filled by insertion of successive clips. Empty cases are ejected to rear, carried around to front of gun by a chute. Firing is controlled by a foot lever for both single shot and continuous fire

You can't ask a gunner to watch his step

Uncle Sam braces gun crews for battle on "A.W." Rolled Steel Floor Plate. Guards against dangerous slipping and falling accidents. "A.W." Floor Plate protects men essential in the war effort wherever they may be—in war production plants, refineries, power plants; in tanks, troop-carrying trucks and on shipboard. Toughest wear will not damage or impair it. Ends floor troubles for good. Write for folder.

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MAIN OFFICE AND MILLS: CONSHOHOCKEN, PENNSYLVANIA : SINCE 1826. District Offices and Representatives: Philadelphia, New York, Boston, Atlanta, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, St. Paul, New Orleans, Pittsburgh, Roanoke, Sanford, N. C., St. Louis, Los Angeles, San Francisco, Seattle, Montreal.

Manufacturers Expand Use of . . . . .

N E STEELS in AIRCRAFT

THE OPERATING COMMITTEE on aircraft materials conservation, representing the Army Air Forces, the Navy Bureau of Aeronautics, and the Aircraft Resources Control Office, Aircraft Production Board, declares that with aircraft use now requiring 35 per cent of the total chromium and nickel consumed for steel alloying, the remaining program of conversion to NE steels must be carried out aggressively. This is particularly necessary because of the continued acceleration in aircraft production which, unless substitutions are made, will push the 35 per cent figure fairly close to 45 in the near future.

Use NE Steels for Air Frames

The use of NE steels has gained substantially in the manufacture of airframes. Recently the Curtiss-Wright Corp. reported: "AN-S-14 (NE-8630) is in use as an alternate for AN-QQ-S-684 (4130) steel and AN-S-16 (NE-8740) for AD-QQ-S-752 (4140). These steels are used interchangeably even on welded assemblies." Lockheed Aircraft Corp. reports: "Test results indicate that AN-S-12 (8630) and AN-T-33 types have satisfactory properties and no difficulties were encountered in weld tests which included flash welding. Impact tests on welding tubing are now in progress. For the present, stocks are segregated but NE-8630 tubing, bar stock and forgings are used interchangeably with AN-QQ-S-684 (4130) and AN-QQ-S-685 and may be substituted on purchase orders." These are but two cases that illustrate the progress being made in using NE steels in airframe construction.

The biggest use of alloy steel in the aircraft industry, however, is in the engines, and while substantial progress has been made here much remains to be done. Naturally, reliable performance is the first thing demanded of an aircraft engine, so that substitutions cannot be made overnight. A large amount of "type testing", in which parts have to run for a certain number of hours without failure, is necessary—and this takes time.

A report by the Wright Aeronautical Corp. recently mentioned the adoption of AN-S-14 (NE-8630) steel in place of AN-QQ-S-684 (4130) steel and the revision of 300 drawings. The report also indicated that the "crankcase and rocker arms made from AN-S-16 (NE-8740) are now under test. All new designs specify NE steels except when model tests are involved. The NE steels are considered equivalent or superior to previous compositions in physical properties and machineability." Some of the other aircraft engine manufacturers have made similar substitutions; Pratt & Whitney Aircraft Division is one of the companies that has effected such substitutions on a sizable scale and this will be augmented when results of type testing now in process are analyzed.

Industry Uses Other Substitutes

Contractors in the aircraft program are expected to do all they can to utilize NE steels successfully as substitutes for alloy steels they now are using. Any questions that they may have concerning specific substitutions may be addressed to the Army Air Forces, Materiel Command, Wright Field, Dayton, O., or the Navy Bureau of Aeronautics, Washington, D. C.

In addition to the campaign to substitute NE steels for alloy steels, many other significant substitutions have been worked out in the aircraft industry. Windshield bands, various supports, bushings, fittings, cover assemblies and bulkheads formerly made of Inconel and Monel are now made of steel and suitably treated for protection against corrosion. Strut tubes, nameplates, strainers, brackets and various other parts including castings which were made from critical aluminum alloys now are made of steel. Aluminum savings effected during the past 12 months by such substitutions are estimated to exceed 80,000,000 pounds.

Much steel has been conserved in the aircraft program through standardization and simplification, by using fewer test samples, increasing allowances for impurities and wider use of welded tubing, open-hearth steel and hot-drum steel.

Directive No. 7 on alternate materials for corrosion-resisting steel cable terminals contributed to conservation by approving the use of alternate steels in place of stainless steel for swaged terminals. A directive now under study will reduce further the use of stainless steel in aircraft. Directive No. 12 approved three steels for all types of bolts, nut and studs for aircraft work. The latter directive has relieved a situation in which the various engine manufacturers asked the bolt producers to furnish bolts in many types of steel which made the production and inventory problem very difficult. Now no bolts, nuts and studs are held uselessly in stock.

Another drive that has helped to save great quantities of critical materials in the aircraft program is the development of improved manufacturing methods which have caused a progressive decline in the amount of scrap produced in this industry; a larger percentage of the metal going into aircraft plants is coming out in the form of finished airplanes. This is due to elimination of inefficient methods of metal cutting, shearing, blanking, routing and stamping. Many items that were made of extruded sections now are rolled; parts formerly cast of critical materials are now stamped from less critical materials; items made from solid bar stock on screw machines are replaced with items made by more economical means such as stampings, castings, tubing, powder metallurgy, composites of welded tubing and forgings; and certain parts fabricated from solid bar stock with excessive borings made from tubing.

The effect of these improvements has been a saving in critical materials, a saving in man hours and machine hours, and a saving in dollars.

Revised Production Methods

One example of an improved manufacturing method is the production by one manufacturer of exhaust nipples. This record is as follows:

Material formerly used—Stainless steel solid bar and tubing

Material now used—Stainless steel sheets

Method formerly used—Machined

Method now used—Stamped

Material saved—91% of bar stock; 65% of tubing

Previous cost—$3.00 each

New cost—$1.65 each

Savings in one order—$660,000

The record of improved production and conservation of materials of another aircraft component is as follows:

Material formerly used—Stainless steel bar stock (critical)

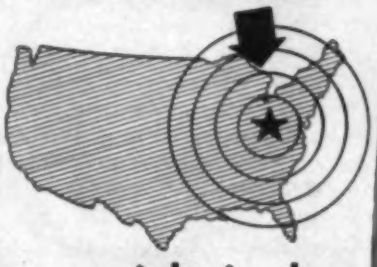
Material now used—Carbon steel strip (less-critical)

Method formerly used—Machining

Method now used—Drawing and drilling

	Old Lbs.	New Lbs.
Material required for production (1000)	285	62.5
Finished Product Weight	47	47.1
Material Loss—Scrap	238	15.4
Per Cent Scrap Produced	83.5%	24.6%

Situated in
PITTSBURGH



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Middle
of the nation's
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Send your materials to

HANLON-GREGORY
GALVANIZING COMPANY

and Fastest
THE WORLD'S LARGEST JOB GALVANIZING PLANT

Heat Treating . . . .

TANK TRACK COMPONENTS

AS A RESULT of several metallurgical meetings on tank track components, the Tank Production Committee, working with the Office of Chief of Ordnance, Geneva, Ill., has issued the following recommendations:

Tank Track Pins: Steel should be either WD-8750 or WD-4060 (for information on complete listing of WD steels see STEEL Feb. 8, 1943, p. 80). If WD-8750 should not be available, WD-4060 can be used if it is obtainable.

Total depth of decarburization on cold rolled annealed bars or hot rolled annealed bars should not exceed 0.015-inch per side. This 0.015-inch decarburization is removed by turning or grinding. To determine depth of decarburization, remove 0.015-inch from each side in the form of chips. These chips for WD-8750 should analyze not less than 0.40 per cent carbon and on WD-4060 not less than 0.55 per cent carbon.

Maximum total decarburization on pin tubing should not exceed 0.005-inch as determined by the above procedure.

Seams, laps, folds and so forth should not exceed a depth of 0.010-inch on cold-rolled and hot-rolled annealed bars and 0.006-inch on tubing.

New sizes of cold drawn bars and tubing that became standard on all purchase orders beginning with May deliveries are: For light pins—tubing, 1.015-inch plus 0.010 minus 0.000; cold drawn bars, 1.019-inch to 1.025 for light pins. For medium pins—tubing, 1.265-inch plus 0.010 minus 0.000; cold drawn bars, 1.269-inch to 1.275 for medium pins; hot rolled bars, to allow minimum 0.010-inch stock removal each side or 0.020-inch on the diameter.

For control of heat treatment or rejection, hardness checks are made on a wafer or cross section cut through the base of the inner radius. This surface shall be prepared so hardness and microstructure are not affected by cutoff. The wafer must be parallel with the base. Hardness obtained on the cross section must be within that specified to a depth of ⅜-inch from the surface. Any method or percentage of samples may be used for spot checking provided such checking will control results expected on samples prepared as above.

In heat treatment of tank track pins, the following factors are emphasized:

—Quenching temperature for WD-8750 and WD-4060 shall be 1500 to 1550 degrees Fahr.

—Minimum time at temperature is 15 to 45 minutes regardless of time required to reach the hardening temperature.

—Pins machined prior to heat treatment must not be decarburized during hardening.

—Oil-quench pins vertically or roll horizontally into quenching medium to minimize warpage.

—Method of oil quenching and construction of quench tank must eliminate interference during quenching by having ample circulation and turbulence to produce a uniform hardness of approximately 53 rockwell C minimum on any surface of the pin properly prepared for hardness checking.

—Quenching oil temperature shall be 100 to 130 degrees Fahr. using paraffin base oils with wetting agents added.

—Quench tank should have a variable speed conveyor for control and time quenching. Preferred stock removal temperature is 250 to 350 degrees Fahr. Stock should not fall below 180 degrees Fahr. after quenching and before tempering.

—Stock should be tempered 1 hour minimum at a minimum temperature of 850 degrees Fahr. for the 40 to 46 rockwell C hardness range for 4063 steel only; 1 hour minimum at 1000 degrees Fahr. for the 34 to 40 rockwell C range for 4063 steel only.

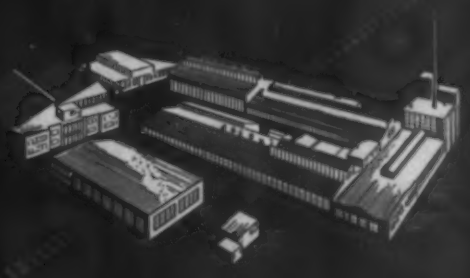
Ball Peening: An improved machining surface on the wedge slot and a full ⅛-inch fillet, blended to the rest of the cut surface of the pin, will improve fatigue life. Ball peening will improve the life of the pin in all cases, it is believed.

Tank Track End Connectors: Obviously the ideal steel structure will not be the same for all machining operations or for all kinds of equipment—a somewhat different structure being pre-

(*Please turn to Page* 131)

One purpose . . .

the IMPROVEMENT of Metals



Shifter yoke formerly made in several pieces now forged in one piece, provides a stronger and more dependable part.

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There is ample evidence, among those whom it is our privilege to serve, that forgings assure and sustain a degree of performance, which ultimately results in a persistent preference for the product or equipment that embodies them. The beneficial influence of forgings, upon the sale of your product during the post-victory period, may be obtained from the broad experience our forging engineers offer you.

DROP FORGINGS

THE STEEL IMPROVEMENT & FORGE CO.

942 East 64th Street CLEVELAND, OHIO

Burn Your Coal

IN THE FIREBOX

. . . . and not in the coal pile

With huge piles of soft coal stored against winter's demands, upper view, means of guarding against spontaneous combustion are more important than ever before

Pipes for applying carbon dioxide in form of dry ice, note lower view, can be made from 3-inch diameter pipe in 15-foot lengths. One end is cut and welded to a point with tip faced with Stellite or similar material to aid penetration into the pile. A set of ⅜-inch holes 6 inches from the point and another set 18 inches from the point allow escape of gas to smother fire when 50 pounds of dry ice are inserted and top cap screwed tightly in place

OVER eighty million tons of soft coal are often stored at one time. This amount is approximately twice the quantity in storage a year ago. Such huge storage piles have been built up at the insistent request of the government in order to guard against delays in transportation as the war effort increases throughout the nation.

Ordinarily, industrial coal users keep just enough coal in storage to take care of current needs. This is piled in such a way that there is little danger from spontaneous heating. However, with unprecedented amounts of coal sought for storage, the conditions of such storage are immeasureably altered.

The hazards of spontaneous heating, resulting in combustion, are constantly increasing and large coal users are still being urged by the government to store even greater quantities. Fires resulting from spontaneous combustion in such coal piles are not imaginary bogies. Every day, more and more serious fires of this kind crackle into the headlines.

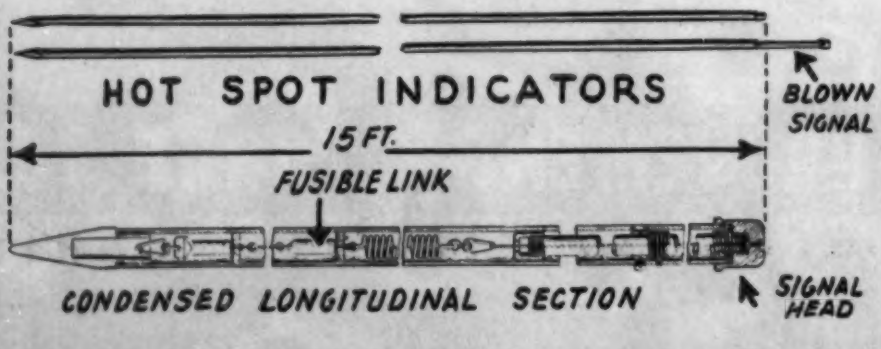
During and after the last war, when similar conditions prevailed, coal was also stored in great piles. At that time special equipment was perfected which provided positive warning of dangerous temperatures developing in the coal piles well in advance of actual ignition. This equipment, known as "hot spot indicators", consists of automatic signaling devices that warn of dangerous temperatures before the coal pile begins to burn.

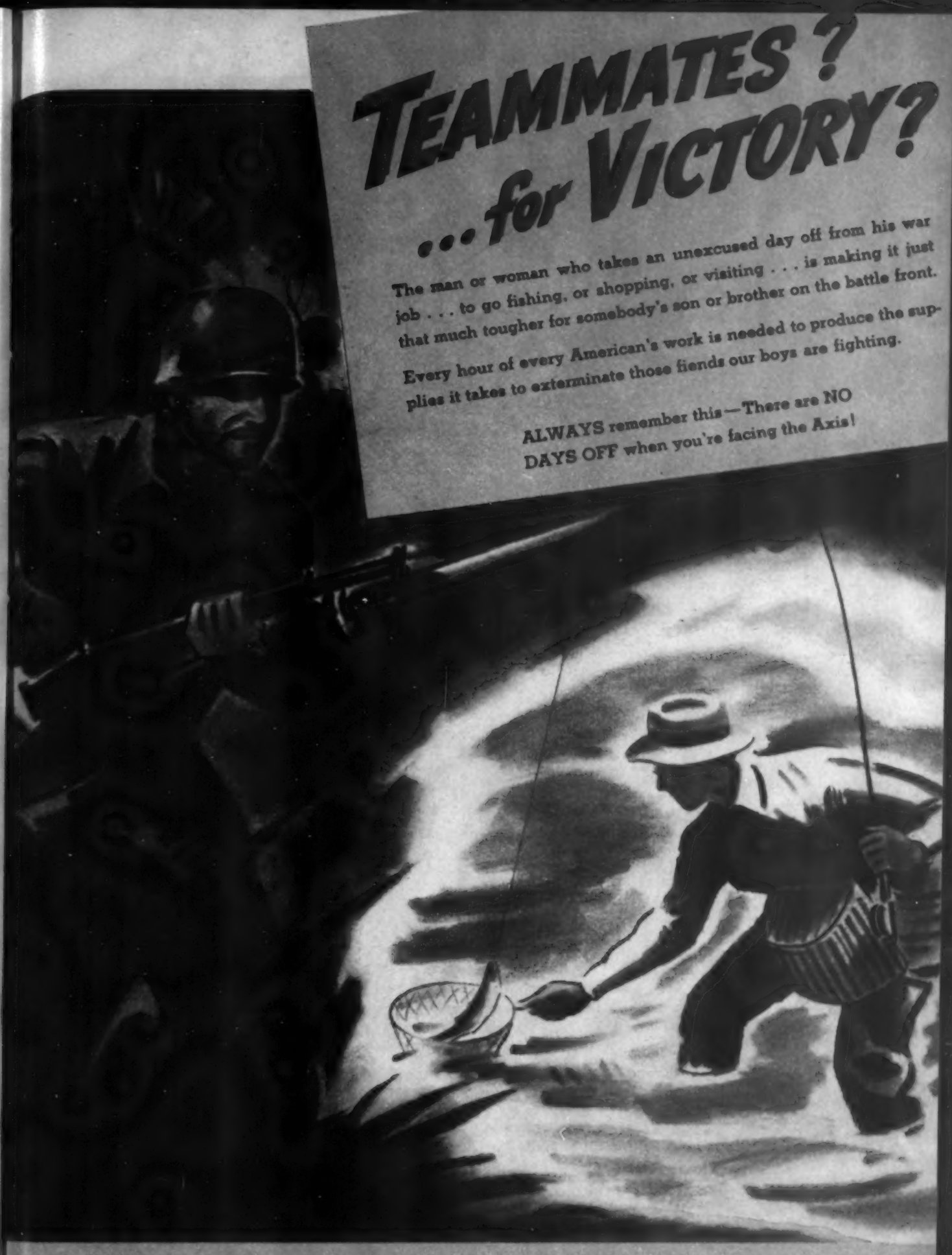
The protection of the coal pile is accomplished by installing these hot spot indicators in the soft coal on 20-foot centers. The indicators are each 15 feet long and thus, every spot on the coal pile where heating might occur is within a 10-foot radius of an indicator. When the temperature at any spot reaches 150 degrees Fahr., a fuse within the indicator melts, and a strong spring forces the signal head upward, so that it may be seen above the top of the indicator at a distance of several hundred feet.

It is an established fact that when bituminous coal reaches the critical tem-

(*Please turn to Page* 143)

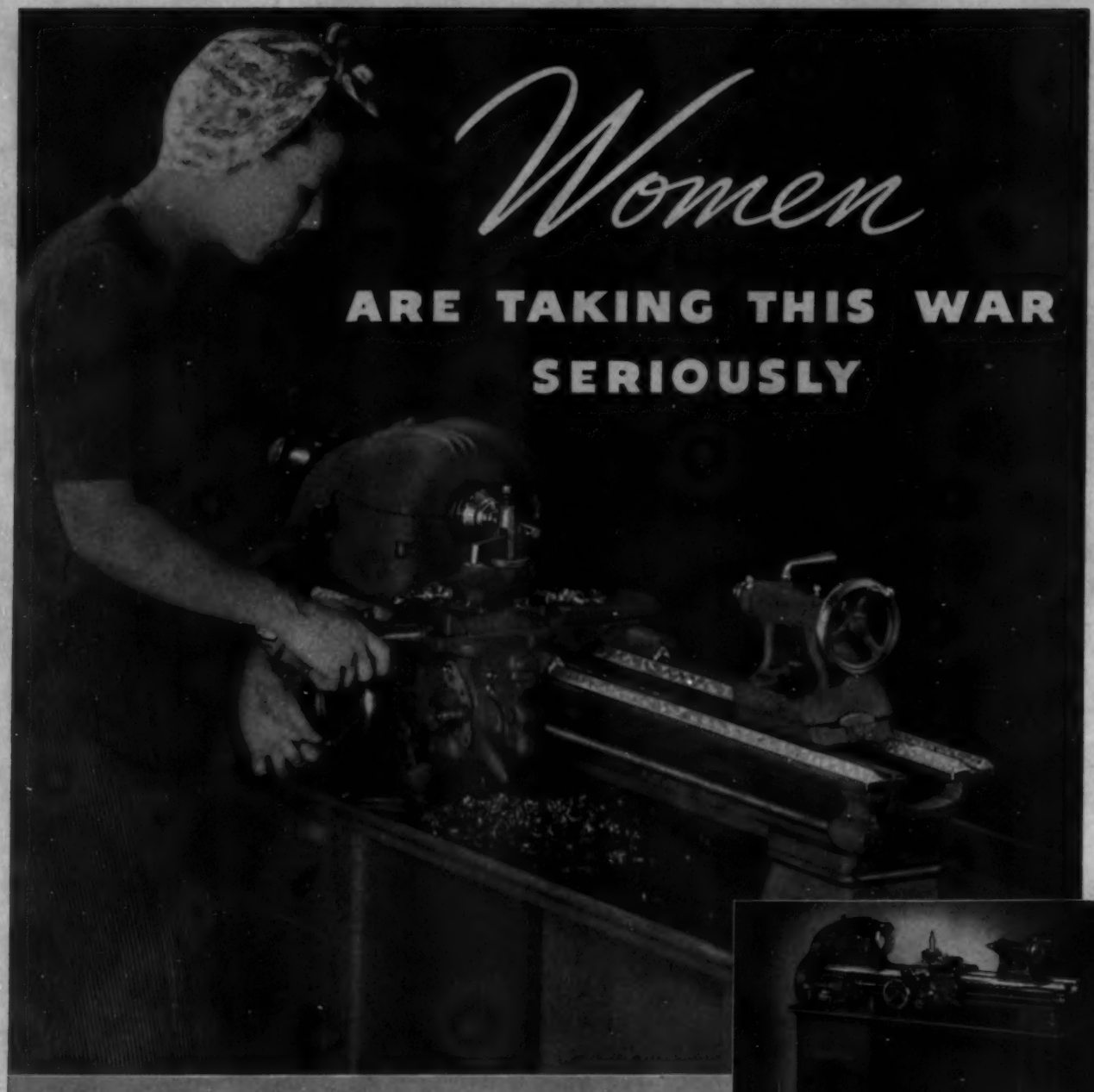
Hot spot indicators have fuses which indicate dangerous temperatures by operating indicator at top of rod as shown here. Signal is seen 300 feet away




TEAMMATES?
...for VICTORY?
The man or woman who takes an unexcused day off from his war job . . . to go fishing, or shopping, or visiting . . . is making it just that much tougher for somebody's son or brother on the battle front.
Every hour of every American's work is needed to produce the supplies it takes to exterminate those fiends our boys are fighting.
ALWAYS remember this—There are NO DAYS OFF when you're facing the Axis!

Note to our customers and friends — **If you want your employees to see this message on Absenteeism, we can furnish it in poster form, 18″ x 24″, for posting on your bulletin boards. Address your request to The Cooper-Bessemer Corporation, Mount Vernon, Ohio, or Grove City, Pa.**

HE COOPER-BESSEMER CORPORATION, Mount Vernon, Ohio — Grove City, Penn



9" swing, South Bend Engine Lathe

With grim determination thousands of American women are doing their best to fill men's shoes. Eagerly they bend their shoulders to wartime tasks—for no sacrifice is too great if it hastens the return of their men from the fighting fronts.

In hundreds of vital war plants, women are operating South Bend Lathes with surprising results. On all kinds of jobs, they have kept up production and maintained established standards of precision. In some factories whole batteries of South Bend Lathes are humming under the guidance of feminine hands.

Since World War I, women operators have preferred South Bend Lathes. Their nimble fingers find the convenient controls well suited to their sensitive touch. They like the fully enclosed design. And, most of all, they appreciate the ease of operation that prevents fatigue and makes the workday seem shorter.

South Bend Engine Lathes and Toolroom Lathes are made in five sizes: 9" to 16" swings, with 3' to 12' bed lengths. The Turret Lathes are made with 9" and 10" swings. Write for Catalog 100C which describes all sizes and types of South Bend Lathes.

BUY WAR BONDS

SOUTH BEND LATHE WORKS

Lathe Builders for 36 Years
SOUTH BEND, INDIANA

BRUSHING WHEELS

. . . . break bottlenecks in weld joint preparation and weld cleaning

PRESSURE of war production and the shortage of manpower are giving industry a growing appreciation of the power-driven brushing wheel. Used in accordance with sound engineering applications, it is eliminating some of the most tedious and time-consuming jobs in all industry. New applications of the brushing wheel are continually being found, relieving bottlenecks and freeing men and women for more productive effort.

In the metalworking industries, one of the tightest bottlenecks being relieved by the brushing wheel is that of the burring of metal parts. Brushing wheels, too, are being used in rapidly increasing numbers to prepare metal for welding, to remove weld and heat scale, to radius sharp corners, and blend surfaces for the relief of stress concentration points on machined parts.

Many striking examples of these accomplishments may be found in the record files of Osborn Mfg. Co., Cleveland, producer of industrial brushes. These records have been accumulating rapidly since the United States entered the war, and since that time the Osborn company has made a thorough brushing analysis in more than 30 major industries.

Industries chiefly to feel the beneficial effect of the brushing wheel are shipbuilding and aviation — plane manufacturers as well as engine builders. In one airplane engine parts factory alone, on one day's visit, a technical representative of Osborn found 20 important operations that brushing wheels were able to speed up appreciably.

Many potential users of these power-driven brushes still have only a rudimentary idea of their function. To many people a rotary brush is still some sort of a wire wheel driven on a flexible shaft or grinder head to scratch paint or rust off metal.

But the needs of industry have given rise to the creation of hundreds of varieties of these wheels, ranging in size from a wheel as small as the end of your little finger for precision instruments, to one 22 feet long used for brushing nap on rug. The wheels have many shapes — some are radial, others are cups and end brushes.

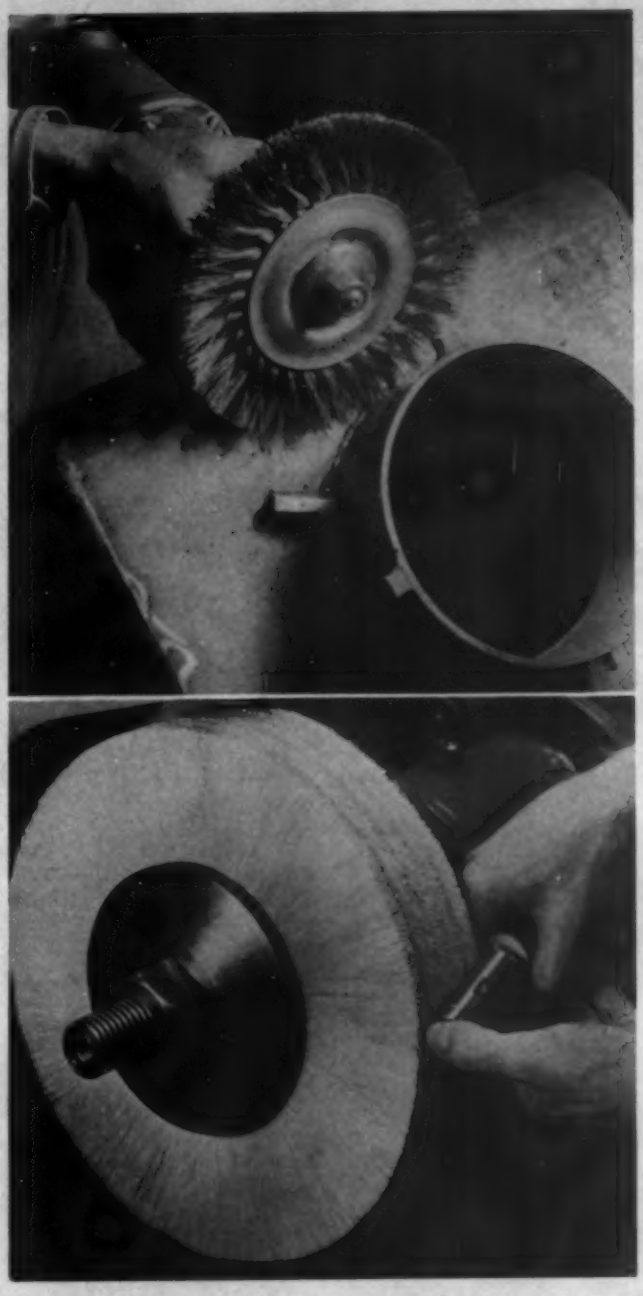


Fig. 1—(Upper view)—Disk center wire sections are designed for safe, rapid and efficient operation on modern high speed equipment and portable tools where extra-heavy brushing is required, such as the weld shown here

Fig. 2—(Lower view)—Treated Tampico section brush, made of fiber obtained from a Mexican plant resembling cactus, is one of most useful brushes in aviation industry

The specification of brushing wheels for particular jobs is usually an engineering task. Several important factors should be taken into consideration. Some of these are the size of the wheel required, the speed with which the brush is run. If the brush is made of wire, the coarseness of the wire is an important consideration; if the brush is made of fiber, then its flexibility and its ability to hold abrasive are vital. The length of trim of the brush and its ability to remain cool are often vital.

The techniques of applying the brush to the work are carefully worked out, such as the speed at which it is driven, the pressure against the work, and the angle at which it is held.

One of the important bottlenecks in the shipbuilding industry before the application of the brushing wheel was the removal of rust, grease, corrosion and scale from the edges of flat steel sheets preparatory to welding. Before the introduction of brushing wheels, many shipyards were hand brushing or grinding the edges of the metal. Hand brushing was obviously time consuming, while the grinding removed more metal than necessary and was not uniformly effective.

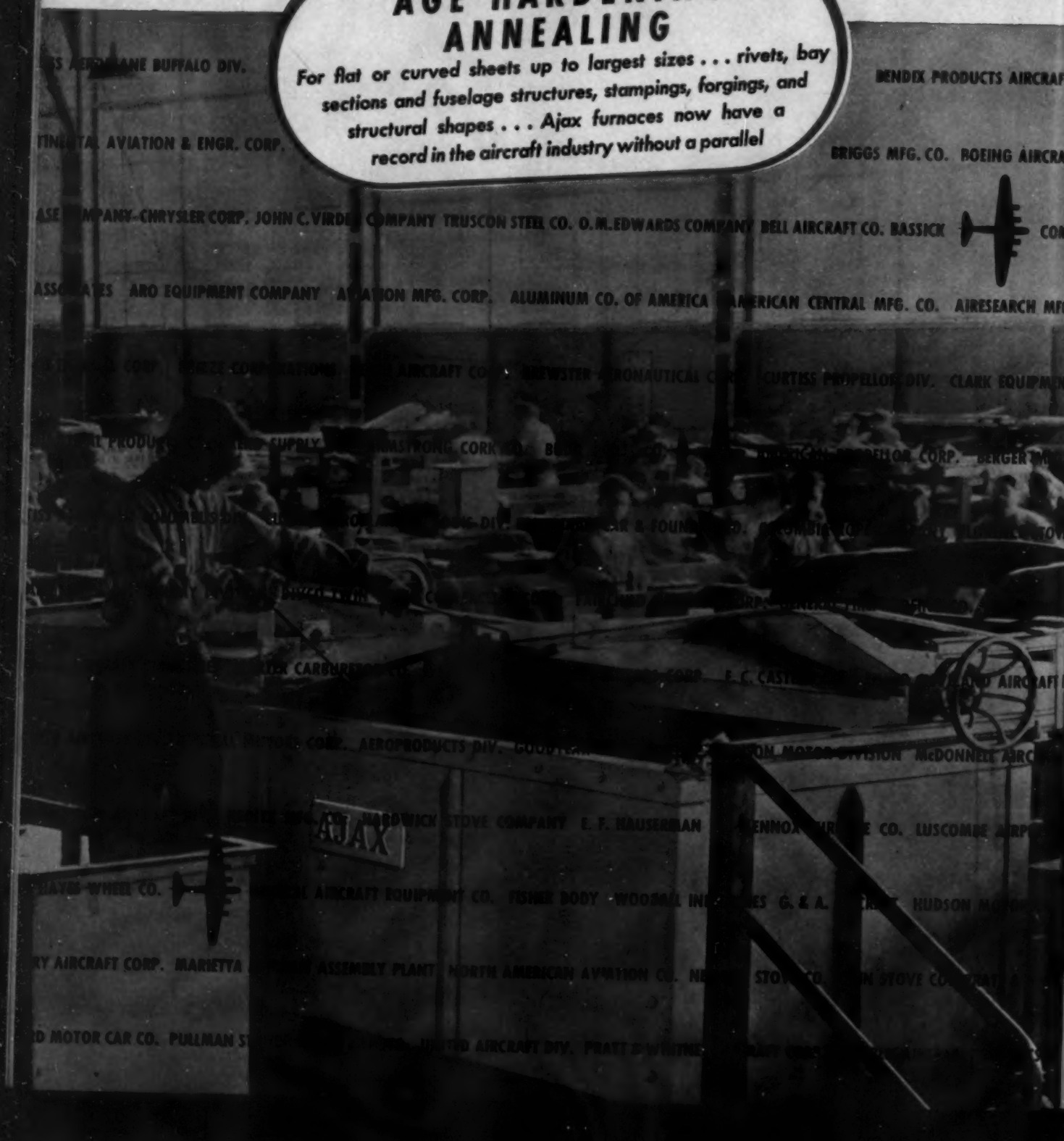
It was recommended that the shipbuilders use two 8-inch disk center section brushing wheels, made of 0.016-inch wire and placed side by side on a shaft driven by an air tool at 4500 revolutions per minute. Not only was there a marked reduction in time, but the brushes did a perfect and uniform job of cleaning, and speeded up subsequent welding operations.

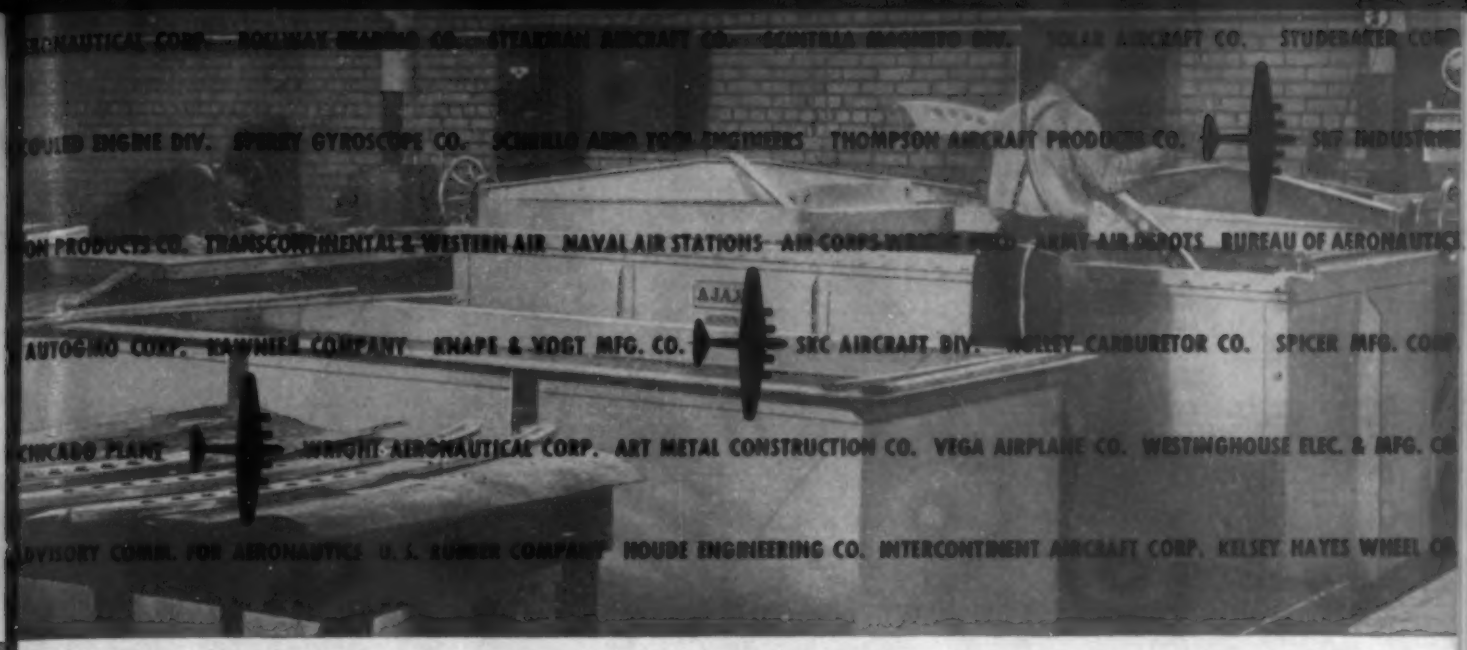
Another time-consuming job was the

'Ajax' Solution
HEAT TREATMENT
of Aluminum Alloys
FOR THE AIRCRAFT INDUSTRY

AGE HARDENING
ANNEALING

For flat or curved sheets up to largest sizes . . . rivets, bay sections and fuselage structures, stampings, forgings, and structural shapes . . . Ajax furnaces now have a record in the aircraft industry without a parallel




AUTOGIRO CORP. KNAPP & VOGT MFG. CO. SKC AIRCRAFT DIV. WRIGHT AERONAUTICAL CORP. ART METAL CONSTRUCTION CO. VEGA AIRPLANE CO. HOUDE ENGINEERING CO. INTERCONTINENT AIRCRAFT CORP.

WHY U. S. AVIATION INDUSTRIES STANDARDIZE ON AJAX FURNACES

The method by which heat is *imparted* to aluminum alloys is the most important single factor determining physical properties during solution heat treatment and annealing. Molten salt is the fastest heating medium known, eliminating grain growth. A salt film likewise eliminates oxidation and retards air chill on transfer to the quench. Moreover, treating in salt imparts definite corrosion-resistant properties.

The entire aviation industry is aware of this, and Ajax Electric Salt Bath Furnaces are its choice today, not only for treating aluminum, but for all exacting processes in the 350 to 2400° temperature range. (REPRESENTATIVE USERS SHOWN HAVE NOT ONE BUT MANY TYPES OF AJAX FURNACES, AMONG THEM THE LARGEST SALT BATHS EVER INSTALLED.)

NEUTRAL HARDENING ALLOY STEEL PARTS

The exclusive Ajax self-heating, self-circulating electrode principle insures even heat transfer at all points. This, with critical temperature control always to within 5° with no overshooting, eliminates distortion. Salt baths do prevent decarburization and 'atmospheric' reactions by sealing off *all* atmosphere, especially important when hardening alloy steel parts such as cylinder sleeves, gears, engine, supercharger, and propeller components, ordnance, wing hinges, bearings . . .

CARBURIZING AND CYANIDE HARDENING

From armor plate with deepest case to smallest cyanided wearing parts, Ajax furnaces are used by the scores in the aviation industries.

HIGH SPEED STEEL TOOLS AND DIES FOR MACHINING

Specific reasons why the country's high production plants use Ajax-Hultgren furnaces are: The method eliminates scaling, oxidation, decarburization, or other surface defects when treating either the molybdenum, tungsten or cobalt types of steel. Moreover, the life of tools hardened in an Ajax furnace is increased 25 to 300 per cent over previously conventional means.

MAINTENANCE COSTS AT THE VANISHING POINT

Ajax salt bath furnaces show a lower overall operating cost than gas or oil-fired equipment. Hundreds of these furnaces are in use for heat treating aluminum—reports show no electrode or pot failure in 7 years! Maintenance costs, always low, are now at the vanishing point. GET CATALOG 107-A OR BULLETIN 110 FOR DETAILS.

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ASSOCIATE COMPANIES:

AJAX METAL COMPANY, *Non-Ferrous Ingot Metals and Alloys for Foundry Use*
AJAX ELECTROTHERMIC CORPORATION, *Ajax-Northrup High Frequency Induction Furnaces*
AJAX ELECTRIC FURNACE CORPORATION, *Ajax-Wyatt Induction Furnaces for Melting*
AJAX ENGINEERING CORPORATION, *Ajax-Tama-Wyatt Aluminum Melting Induction Furnaces*

Fig. 3—Small spur gear sections greatly enlarged. Above are shown nicks and burrs before brushing. Note how these have been removed in lower view, sharp edges being rounded off smoothly

TABLE I—Typical Brushing Applications in Welding and Other Work

MATERIAL	OPERATION	PREVIOUS METHOD	BRUSHING WHEEL FORMULA	RESULT
Inside pipe ends	Remove scale before and after welding	Grinding with small wheels	Two-inch diameter; Ringlock section Brushing wheel .014 S.A. wire; ⅜-inch arbor hole; small air tool; 20,000 revolutions per minute	100 per cent increase in speed; improved results
Steel tubing	Remove burrs from ends	Hand operation	Eight-inch diameter; Disc Center Section wheel; .014 wire; 1¼-inch arbor hole; polishing jack at 3000 revolutions per minute	Uniform results; 100 per cent increase in speed; fractures prevented
Sheet metal	Remove burrs from drill holes	Each hole done separately with special burring tool	Riehl section; three-inch diameter, portable electric tool; 2750 revolutions per minute; face of brush passed over several holes at once	Definite increase in speed depending on number of holes in sheet
Alclad sheets of various shapes	Removal of burrs after routing	Sheets held individually against tapered spindle covered with emery cloth	Master Wheel; eight-inch diameter; .0095 wire; ½-inch arbor hole; 3000 revolutions per minute; as many as 12 sheets at one time	Very definite increase in speed
Small aluminum castings	Removal of burrs and small millouts	Hand scraping; filing and emery cloth	Monitor Section; 12-inch diameter; .008 wire; 1¼-inch arbor hole	50 per cent speed increase; results uniform; scratching prevented
Aluminum castings	Remove burrs from small recesses	Hand scraping	Ringlock Section; two-inch diameter; .0118 wire; ½-inch arbor hole	Desired finish is uniform; speed-up is very material
Duralumin sheets	Removal of burrs from edges	Hand V knife	Monitor section; ½-inch diameter; .008 wire; 1¼-inch arbor hole; 3000 revolutions per minute on floor stand grinder; two or more sheets at a time	Burrs removed without marring or scratching metal; 100 per cent speed increase
Pressed fiber material	Removal of flashing	Hand filing	Riehl Section; six-inch diameter; .004 wire; ½-inch arbor hole; 3000 revolutions per minute on bench grinder	500 per cent speed increase
Welded seams in narrow, out of the way pieces	Removal of rust and welding scale	Hand wire brushing	Cup brush; 3½-inch diameter; .020 S.A. wire; ½-inch arbor hole; electric or air tool; 2700 revolutions per minute	Speed increase 500 to 1000 per cent. Removal is more thorough
Various metal objects in machine shop	General cleaning, polishing, removal of rust and other foreign matter	Hand brushing, sandpapering, etc.	Master wheel; 15-inch diameter; .0118 wire; 1750 revolutions per minute; standard polishing jack	Brush flexible enough to do good cleaning job without excessive scratching; time saving very definite

brushing of areas of steel plates from which scale had been partially removed by blow torches. The process of cleaning off the deflamed surfaces was speeded up 100 per cent when a double-row cup brush was adopted.

Designed to give exceptionally long service when used with heavy-duty high-speed tools, the cup is 6 inches in diameter containing 0.020-inch special analysis wire, and is operated on an air tool at 3000 to 4200 revolutions per minute, with the speed regulated by valve on the tool. See Fig. 4.

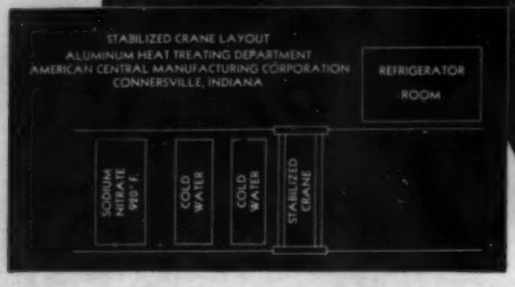
As an illustration of how important it is that brushing techniques be worked out carefully, a shipyard where an Osborn brushing analysis was made had been using a single-row brushing wheel containing 0.035-inch wire. Although the wire was only a few sizes too heavy, it left blue heat marks on the metal. The difficulty was removed immediately by a slight reduction in the size of the wire.

Most difficult of the weld cleaning jobs occur when the welds are situated in the bottoms of extremely narrow grooves or in corners formed by three mutually perpendicular plates.

The cleaning of built-up welds in narrow grooves was greatly expedited by

(*Please turn to Page* 134)

Fig. 4—This double-row cup brush is highly effective in cleaning flat surface welds. It is 6 inches in diameter, has a ⅝-inch arbor hole



STABILIZED CRANE PROVIDES SPEED NECESSARY FOR SALT BATH HEAT TREATING

SPEED in handling is a primary requisite when heat treating parts by the salt bath method. A Cleveland Tramrail stabilized crane at the American Central Manufacturing Corporation, Connersville, Indiana, provides the speed necessary for the successful treatment of aluminum parts and sheets prior to forming, for airplane wings that they manufacture for dive bombers and other aircraft.

As illustrated in the photograph and diagram, the parts and sheets are soaked in a sodium nitrate bath held at 920 degrees Fahrenheit for varying times depending upon the metal thickness. For aluminum sheets .040-inch thick this time is 20 minutes. Then, by means of the stabilized crane the parts are quenched in two cold water tanks and delivered to a point just outside of a refrigerator room. The operator takes them from the basket and quickly places them into this room where the temperature is kept at approximately zero Fahrenheit. The total time from the hot tank to storing in the cold room must be kept to four minutes or less, to prevent the parts from hardening prematurely.

The Cleveland Tramrail stabilized crane is particularly advantageous for this work as well as for anodizing, chromodizing and other tank operations, because it will raise and lower the load quickly without swing. The patented hoisting rope arrangement is such that loads can be elevated as firmly and precisely as though in an elevator shaft.

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for Severe Operating Conditions

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R-167

Fabricating

STEEL COKE OVEN DOORS

By HENRY A. IMMISCH
Master Mechanic
Columbia Steel Co.
Ironton, Utah

BECAUSE OF the limited operations at the Ironton plant, Ironton, Utah, of the Columbia Steel Co., which originally included a 600-ton blast furnace and two batteries of by-product coke ovens, a separate welding department never has been deemed necessary. Therefore, the welding which has to be done at this plant has become a side function of the mechanical department. At present the welding equipment consists of three electric welding machines, and several sets of oxyacetylene welding torches.

The cast iron coke oven door seems prone to warp and crack under the high degree of heat to which it is subjected. In many instances it became necessary to remove the cast iron doors, straighten them by cold working, and then fill the cracks by welding. Because of the constantly increasing amount of repairs and excessive cost necessary to maintain the doors in a satisfactory operating condition, the management decided to purchase a considerable number of new coke oven doors. First we experimented with a pair of steel welded coke oven doors and decided to install them. After observing these doors closely for several months, keeping a record of their service qualifications such as warpage, cracking, etc., it was found that the steel doors did not have a tendency to warp thus reducing the breaking, cracking, and repairing that was found prominent in the cast iron doors. The steel doors also were lighter and constructed so as to provide greater heat radiation. It was for these reasons that the management decided to purchase welded steel doors in preference to the present cast iron doors.

The local company which quoted $138 per door for each of the two trial doors purchased, experienced considerable trouble in the manufacture of them. The final price was raised to $198 per door. Reports from the welders participating in the construction of the trial doors stated that they encountered numerous difficulties in that they were unable to keep the doors from warping.

In February, 1941, price inquiries for 48 oven doors were sent to three different companies; the following proposals and quotations were received:

A local concern quoted $4800, job site on 24 pusher side steel electric welded coke oven doors.

A second company quoted $250 each pusher side door, f.o.b., Los Angeles, and $270 each coke side door, f.o.b., Los Angeles.

A third company quoted on the 24 coke side doors $3240 f.o.b. Johnstown, Pa., and on 24 pusher side doors $3480, f.o.b., Johnstown, Pa.

Management, however, decided to make the doors at the plant. A study showed that the undertaking would necessitate the full time services of a boilermaker and two electric welders. The mechanical crew at our plant is for maintenance work only; hence, additional help was sought from other sources. A boilermaker was hired but no experienced electric welders could be found.

Coincidentally, an instructor of an electric welding class recommended one of his students, who at that time had about 500 electric welding class hours to his credit. The majority of these class-hours had been spent on a 300-ampere electric welding machine. This student welder was employed. An employe from the yard department was advanced to the mechanical department as boilermaker helper. These three men made up the foundation of the crew.

During the interim of the ordering and receiving of the materials for the construction of the doors, considerable thought was given to the procedure which should be followed. Consultation was held with the three men, explaining the blueprints of the construction of the doors, and making the method or procedure clearly understood. Particular caution was taken to avoid the difficulties which had been experienced

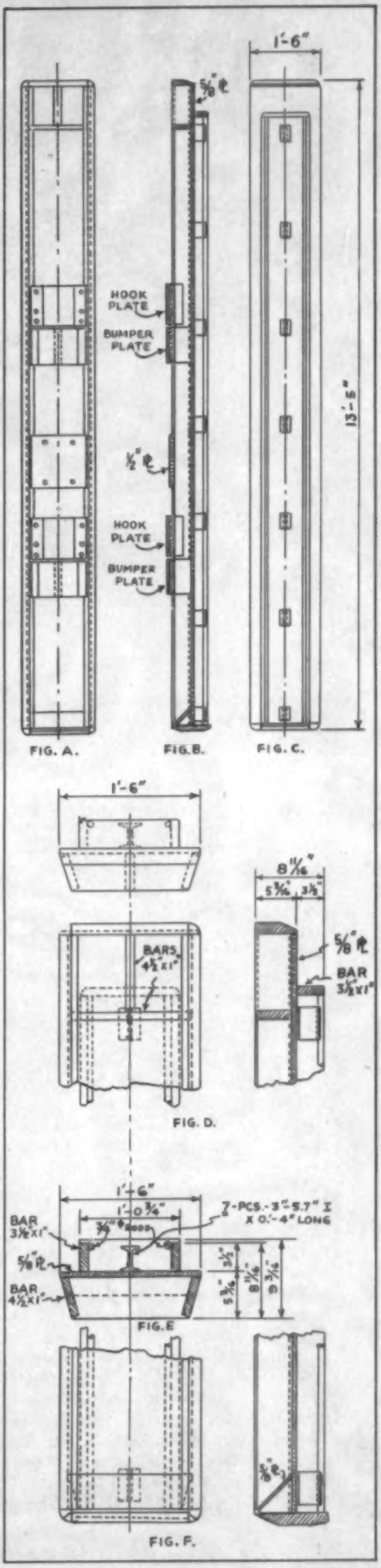

Fig. 1—General arrangement and enlarged sections of welded steel door

From a paper submitted to the James F. Lincoln Arc Welding Foundation in its $200,000 industrial progress award program for reports, advances and improvements made by applications of arc welding in design, fabrication, construction and maintenance.

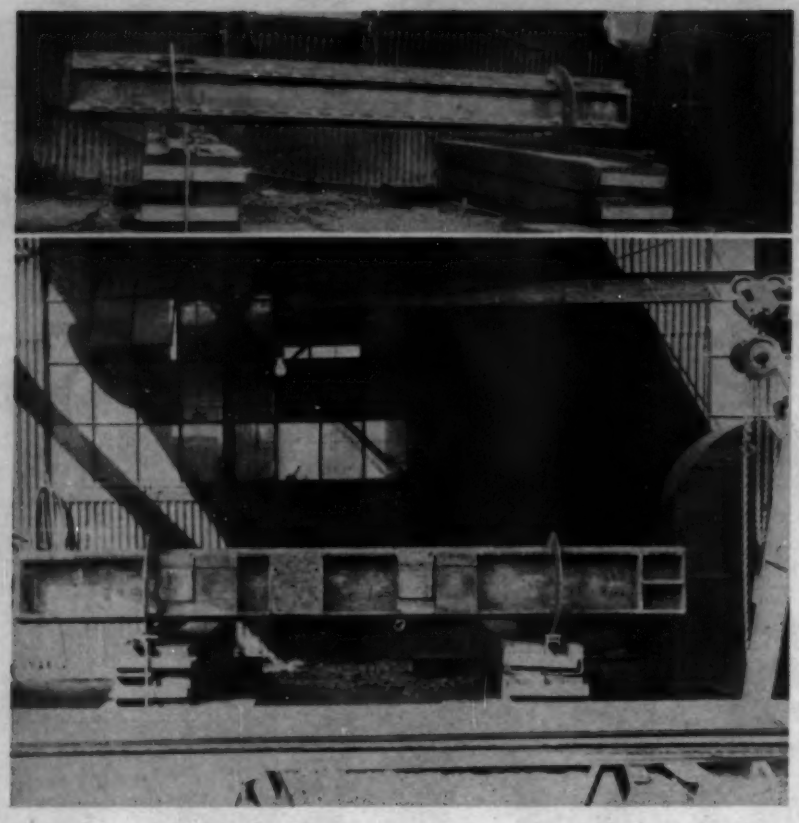

Fig. 2. (Left, above)—Door in the process of assembly

Fig. 3. (Below)—Steel wedges were used to hold plate against door

by the welders who had worked on the two trial doors ordered from the local concern. With these difficulties clearly in mind construction of the new doors started.

The 1 x 3½-inch bars which came in 20 foot lengths were cut as shown on Fig. 1-E; the ¾-inch round bars were cut to lengths which were welded to the 1 x 3½-inch bars. Expecting minor difficulties during this procedure, one of the bars was completed to determine the amount of warpage. The 1 x 3½-inch bar warped 2½ inches flatwise and ⅞-inch edgewise, forming almost a perfect radius. Knowing that it was impossible to stop this warpage when the ¾-inch rod was welded to it, the next 1 x 3½-inch bar was cold bent to 2½ inches and ⅞-inch, before the next bar was welded. This procedure greatly improved the warping condition, but the cold bend was a little too much. A third bar was tried with a 2¼-inch bend flat-wise and the same ⅞-inch bend edgewise. When the ¾-inch round bar was welded to this bar it was almost straight; the little warp that was still in the bar was easily straightened. This procedure was followed on the rest of the bars for the 48 doors.

Two 1 x 4½-inch bars which came in 20-foot lengths and the ⅝-inch plates which came in various widths were cut to the proper length and size by an acetylene cutting machine. These ⅝-inch plates were of various sizes, 3 feet by 12 inches, 4 feet by 15 inches, and 6 feet by 30 inches. The 3-inch I-beams were cut to 4-inch lengths as shown on Fig. 1-C. The number plate, bumper plates, and hook plates were then cut from the ⅝-inch plates. Having the material cut for the construction of one door, the assembling of the door was started. Two steel saw horses were situated in a level position as shown in the foreground of Fig. 2. The ⅝-inch plate was placed on these horses, laid out for dimensions, centerline, etc. The 1 x 3½-inch bars were clamped to the ⅝-inch plate with thumb clamps and tack welded into place; this part of the door was then turned over the 1 x 4½-inch bars, number plates, and hook plates, and bumper plates were also tack welded into place. After the door was completely tacked together it was ready for the welding process.

As these doors weighed 1435 pounds and 1675 pounds for the pusher side and coke side respectively, a device was planned whereby they could be handled with the minimum amount of trouble. Outside the machine shop there is a chain block and a small jib crane (Fig. 3) suitable for handling the doors; thus the cost of installing any additional hoisting devices was eliminated. A set-up was arranged so that a desirable position for welding could be obtained and the procedure followed is the whole crux of the job. Two circular ⅝-inch plates, 22 inches diameter, were obtained for the pusher side door which is 16 inches in width. From the center of these circular plates the shape of the door was cut out, thus allowing the plates to slip over each end of the door. With the use of steel wedges the plate was wedged tight against the door as shown in Fig. 3. The width of the coke side doors was 18 inches; so that another set of plates were required for these doors.

Blocks and railroad ties were set and spaced to conform with the distance between the circular plates which had been placed over the ends of the door. Two pieces of 3-inch I-beam of sufficient length to allow complete turn of the ⅝-inch circular plates were used to act as a track or guide, making the manipulation of the door easy and also making it convenient for two or more welders to be working at the same time.

Operation of the welding setup proved that two welders could work simultaneously and with success. The procedure involved starting in the center of the door—welding toward the ends in the "step-weld" method—that is, to weld for 2 inches, then leave a 6-inch space, and then weld for 2 inches again—working on both sides of the door at the same time. By this arrangement the doors could be welded without warping and without clamping the door to a massive face plate, thus allowing the expansion and contraction to take care of itself. To carry out this procedure another student welder who had about 500 class hours to his credit was employed.

Welders Enthusiastic

At the completion of the first door the welder who was first hired became so enthusiastic over the success obtained with the unique welding arrangement and the ease with which the heavy doors were handled that he immediately began investigating the various methods which other concerns were using in fabricating these doors. He found that the method just described for welding and handling the doors, namely, that of inserting the ends of the door into the center of a circular plate and placing such on a track so as to provide a complete revolution of the door, as well as enabling two welders to work simultaneously, one welding on the inside of the bottom 1 x 4½-inch bar, was more efficient than any other method now in use.

With the two welders working so successfully together, and the simple device for handling the doors operating far beyond expectation, attention was

(*Please turn to Page* 138)

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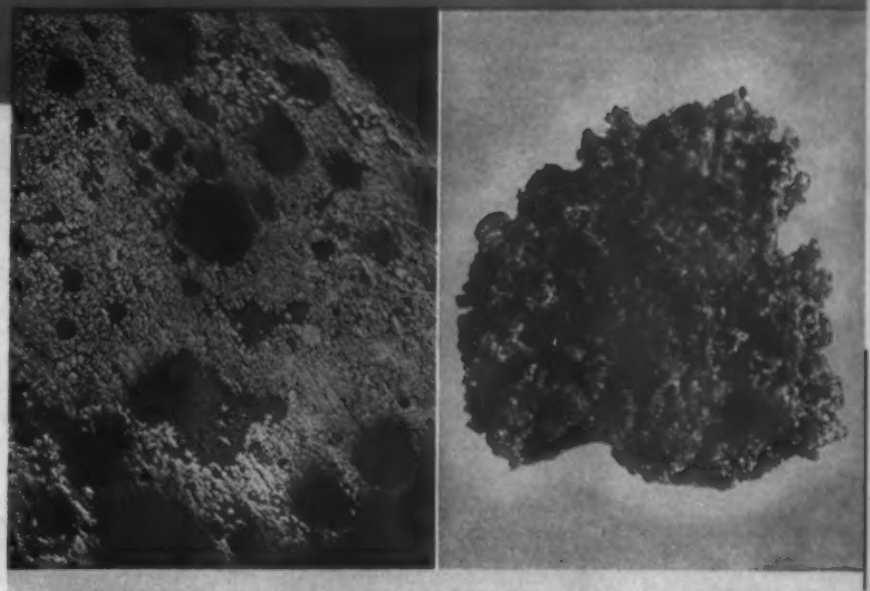
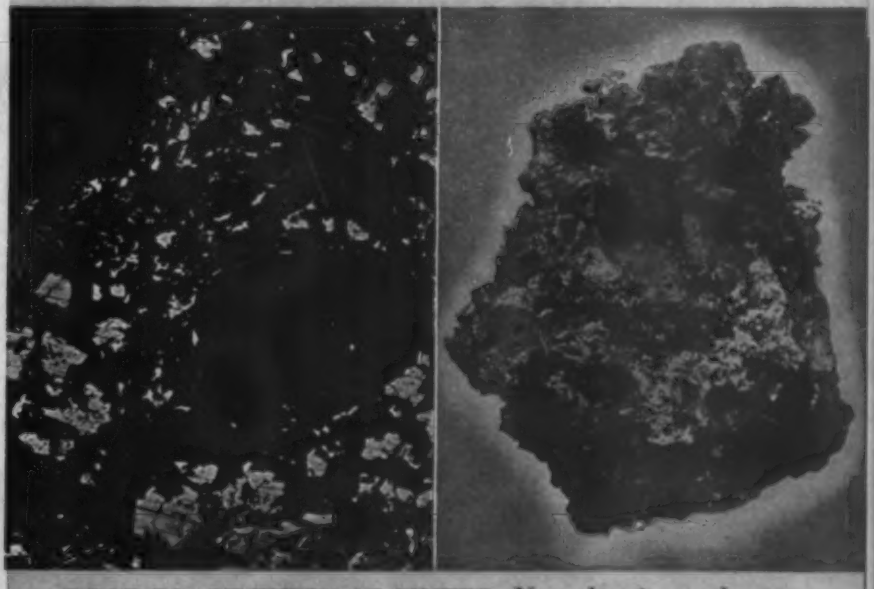


IDEAL BLAST-FURNACE SINTER. *Microscopic cross section of sinter (100 times enlarged) shows uniform cell structure which provides maximum surface for gas contact.*



POOR BLAST-FURNACE SINTER. *Note density and uneven cell structure providing poor gas contact.*

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ASTM

Committees Report

IMPORTANT NEW STANDARDS

MANY IMPORTANT actions on standards and results of research investigations featured the 1943 *annual meeting of the American Society for Testing Materials held in Pittsburgh recently. See story in* STEEL, *July* 5, *p.* 67 *for information on attendance, awards made.*

A measure of accomplishments in standards work is represented by the number of new specifications and tests approved at the meeting, which this year number about 50, *comparing favorably with* 1941 *and* 1942. *On top of this, there has been constant work throughout the year on emergency specifications and provisions issued from week to week.*

These numerous emergency specifications are a direct contribution to winning the war for they assure more effective use of available materials. Co-operating closely with ASTM committees were other organizations and government bodies, particularly the Army, Navy and WPB. Many ASTM specifications and tests are incorporated in limitation orders.

Because of the significance of many of these new specifications, some of their most important points are highlighted here for the busy technician who may not have time to examine them in more detail.

—The Editors

A LARGE NUMBER of members of Committee A-1 on Steel have been extremely active in the National Emergency Steel Specification Project (NESS). Based on the work of several NESS Technical Advisory Committees, WPB issued a general Limitation Order L 211 prohibiting the production, fabrication, delivery, acceptance or use of any material except as covered in the schedules appended to the order from time to time. Up to May 15, ten such schedules have been approved, including: Concrete Reinforcement Steel; Steel Wheels and Tires; Barbed Wire, Wire Fence, Poultry Netting and Poultry Flooring; Structural Steel Shapes; Steel Axles and Forgings (Railroad and Transit Services); Mechanical Steel Tubing; Rails and Track Accessories; Carbon Steel Plates; Oil Country Tubular Goods; Water Well Tubular Products.

Seven Specifications Issued

Seven complete emergency specifications issued include ES-21 on carbon-steel and alloy-steel forgings for magnetic retaining rings for turbine generators; ES-22 on alloy-steel forgings for nonmagnetic coil retaining rings for turbine generators; ES-23 on carbon-steel forgings for rings for main reduction gears; ES-24 on carbon-steel and alloy-steel forgings for pinions or main reduction gears; ES-25 on carbon-steel and alloy-steel forgings for turbine generator rotors and shafts; ES-26 on carbon-steel and alloy-steel forgings for turbine rotors and shafts; ES-27 on carbon-steel and alloy-steel forgings for turbine bucket wheels.

One of the perplexing problems in connection with these specifications was simplification of chemical composition. There were quite a large number of grades in use and a limited number was desirable to expedite tonnage and simplify steel making, forging and fabricating problems. This achievement in the specifications represents an outstanding accomplishment. To achieve the conservation of critical elements most effectively, chemical ranges are set up for some of the products—*exact* figures being subject to agreement between producer and consumer. These turbine parts so extremely important in ships and other work, need considerable alloying elements in many cases in order to prevent excessive wear and to produce the required combination of strength and ductility. A list of Emergency Alternate Provisions will be found in Table I.

The Emergency Provisions and Specifications for Carbon-Steel Axles, EA-A 21, increase availability of acid open-hearth steel by permitting a maximum phosphorus of 0.055 per cent for acid steel and 0.05 per cent for basic steel.

The provisions applying to the carbon-steel forgings for general industrial use, EA-A235, establish Class A as a carburizing steel providing a definite carbon content and deleting any physical requirements for this class. It provides for heavy forgings over 20 inches in solid diameter or thickness.

Provisions in EA-A 237 on alloy-steel forgings also establish physical requirements for Class B forgings of large size.

The rather extensive provisions in the specification EA-A 236 for carbon-steel forgings for locomotives and cars, provide for use of Class A as a carburizing steel, modify phosphorus and sulfur content of certain classes and provide two considerably higher strength classes of materials in quenched-and-tempered condition designated Class H and I. These higher strength forgings were considered very essential by a number of railroads so that it would not be necessary for them to re-design and re-balance certain parts which perhaps could not be obtained in alloy steels. Other changes were made to expedite production. EA-A 236a merely extends the scope of emergency Class H material to be applicable for locomotive and tender axles.

In EA-A 238 for alloy-steel forgings for locomotives and cars, phosphorus and sulphur content of acid open-hearth steel was raised.

Raise Sulphur Limit

The emergency provisions in four specifications on steel wheels permit sulphur content of acid steel to be as high as 0.06 per cent as compared with the present basic steel top of 0.05 per cent. The additional provisions in the wheels for electric railway service give requirements for spun steel wheels and as a service include the tables of dimensions of standard wheel designs part of the WPB Limitation Order L 211.

Steel Castings: Emergency alternate provisions, EA-A 148a, for alloy steel castings for structural purposes were established to concentrate production of six classes, which a very extensive survey of the industry indicated could be produced in reasonably large quantities. Two of the so-called regular grades, 1 and 2 of Class A, were retained and the other four are emergency grades.

Pipe and Tubing: In this field the

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numerous emergency alternate provisions were developed in the NESS Technical Advisory Committee on Tubular Steel Products.

An outstanding standardization achievement is the establishment of a master list of some 18 different compositions of carbon and alloy steels for pressure tubes—an important reduction from the number of existing standard grades. Then by use of emergency alternate provisions production can now be concentrated on steels with these chemical requirements. Primarily affected are tubular products in the boiler and superheater tubes field, still tubes, and heat exchanger tubes. A number of revised chemical requirements are justified to keep analyses in line with the scrap situation, others are intended to conserve molybdenum and other elements.

Boiler and Superheater Tubes: The inclusion of "ASTM Specification Number" in the marking clause in A 83 and A 178 results from the desire of the Boiler Code Committee that this number be given and although there has been some objection from the production standpoint, manufacturers have expressed willingness to go along with this change during this period as an emergency.

Complete Grades by Steps

In Specifications A 213 (alloy boiler tubes) a widely used standard, two new emergency classes TE 7 and TE 9 (7 and 9 per cent chromium) complete a series of grades by steps and enable the producer and consumer to effect most easily conservation of alloying elements.

Still Tubes for Refinery Service: The change in molybdenum requirements is to conserve this extremely critical alloy. The transfer of the chromium-molybdenum type from Specifications A 188 to Specifications A 200 concentrates requirements for alloy-steel tubes in the one specification with six grades which the producers and consumers agree are essential.

Heat Exchanger and Condenser Tubes: The notes on hydrostatic test requirements added in Specification A 179 and A 214 follow the pattern used in other ASTM steel specifications providing for considerably higher hydrostatic testing when the material is to be used under more rigorous conditions than normally would be the case. Material conforming to these two specifications is used in all new extraction feedwater heaters, which operate at pressures considerably above 1000 pounds per square inch.

Pipe Specifications: Certain of the emergency provisions in the seven specifications of this group are to make them more suitable during the emergency for use for water main pipe and water service. These specifications are being recommended to the WPB for incorporation in the list of so-called master steel specifications.

The provisions concerning wall thickness were a distinct compromise between two quite different practices with respect to pipe thicknesses, namely, the use in the western United States and Pacific coast area with its very light walls, and the Eastern practice, where considerably heavier walls are employed. For similar reasons references are being added to corrosion problems and coatings, and reference is to be made to the American Water Works Association requirements on protective coatings.

Specifications A 139 are widely used in connection with oil pipe lines, and the note being added in Section 14 of EA-A 139 referring to API thread standards is very important. The Emergency provisions in EA-A 139a were set up to cover pipe sizes down to 4 inches in diameter (present size limited to 8 inches but not including 30 inches) and also to bring the requirements on elongation value in line with changes made as a regular feature in the Specifications A 53 and A 106—these elongation values being set up according to wall thickness of the material.

The provisions in EA-A 53a widely used for general pipe standard were desirable in order to provide standardized requirements for a Grade C material which is used for water well pipe and is incorporated in Schedule 10 of WPB Order L 211. The NESS Technical Advisory Committee, in recommending Specifications A 53, could not otherwise include Grade C, and to simplify the mechanics this provision was established.

Committee A-1 on Steel reported approval of "Tentative Specification for Heat-Treated Carbon-Steel Bolting Ma-

(*Please turn to Page* 140)

TABLE I—Partial List of Emergency Alternate Provisions

Designation	Standard and Tentative Standard Specifications for:	Issued
	FORGINGS	
EA—A 21,	Carbon-Steel Axles for Cars and Tenders (A 21—36)	Oct. 5, 1942
EA—A 235,	Carbon-Steel Forgings for General Industrial Use (A 235—42)	Jan. 20, 1943
EA—A 236,	Carbon-Steel Forgings for Locomotives and Cars (A 236—42)	Aug. 12, 1942
EA—A 236a,	Carbon-Steel Forgings for Locomotives and Cars (A 236—42)	May 8, 1943
EA—A 237,	Alloy-Steel Forgings for General Industrial Use (A 237—42)	Jan. 30, 1943
EA—A 238,	Alloy-Steel Forgings for Locomotives and Cars (A 238—42)	Oct. 5, 1942
	WHEELS	
EA—A 25,	Wrought Steel Wheels for Electric Railway Service (A 25—41)	June 22, 1942
EA—A 25a,	Wrought Steel Wheels for Electric Railway Service (A 25—41)	Aug. 24, 1942
EA—A 57,	Multiple-Wear Wrought Steel Wheels (A 57—39)	June 22, 1942
EA—A 186,	One-Wear and Two-Wear Wrought Steel Wheels (A 186—39)	June 22, 1942
EA—A 244,	Heat-Treated Wrought Steel Wheels (A 244—42)	June 22, 1942
	CASTINGS	
EA—A 148a,	Alloy-Steel Castings for Structural Purposes (A 148—42)	April 27, 1943
	PIPE AND TUBING	
	Boiler and Superheater Tubes	
EA—A 83	Lap-Welded and Seamless Steel and Lap-Welded Iron Boiler Tubes (A 83—42)	Aug. 18, 1942
EA—A 178	Electric-Resistance-Welded Steel and Open-Hearth Iron Boiler Tubes (A 178—40)	Aug. 18, 1942
EA—A 192	Seamless Steel Boiler Tubes for High-Pressure Service (A 192—40)	Aug. 18, 1942
EA—A 209	Seamless Carbon-Molybdenum Alloy-Steel Boiler and Superheater Tubes (A 209—42)	Aug. 18, 1942
EA—A 213	Seamless Alloy-Steel Boiler and Superheater Tubes (A 213—42)	Aug. 24, 1942
EA—A 226	Electric-Resistance-Welded Steel Boiler and Superheater Tubes for High-Pressure Service (A 226—40)	Aug. 18, 1942
EA—A 249	Atomic-Hydrogen-Arc-Welded and Electric-Resistance-Welded Alloy-Steel Boiler and Superheater Tubes (A 249—42)	Aug. 24, 1942
EA—A 250	Electric-Resistance-Welded Carbon-Molybdenum Alloy Steel Boiler and Superheater Tubes (A 250—41 T)	Aug. 24, 1942
	Still Tubes for Refinery Service	
EA—A 161	Seamless Low-Carbon and Carbon-Molybdenum Steel Still Tubes for Refinery Service (A 161—40)	Aug. 18, 1942
EA—A 200	Seamless Intermediate Alloy-Steel Still Tubes for Refinery Service (A 200—40)	Aug. 18, 1942
	Heat-Exchanger and Condenser Tubes	
EA—A 179	Seamless Cold-Drawn Low-Carbon Steel Heat-Exchanger and Condenser Tubes (A 179—42)	Aug. 18, 1942
EA—A 199	Seamless Cold-Drawn Intermediate Alloy-Steel Heat-Exchanger and Condenser Tubes (A 199—40)	Aug. 18, 1942
EA—A 214	Electric-Resistance-Welded Steel Heat-Exchanger and Condenser Tubes (A 214—42)	Aug. 18, 1942
	Pipe	
EA—A 53	Welded and Seamless Steel Pipe (A 53—42)	Jan. 30, 1943
EA—A 120	Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses (A 120—42)	Aug. 24, 1942
EA—A 134	Electric-Fusion-Welded Steel Pipe (Sizes 30 in. and Over) (A 134—42)	Aug. 18, 1942
EA—A 135	Electric-Resistance-Welded Steel Pipe (A 135—42)	Aug. 24, 1942
EA—A 139	Electric-Fusion-Welded Steel Pipe (Size 8 in. to but not Including 30 in.) (A 139—42)	Aug. 18, 1942
EA—A 139a	Electric-Fusion-Welded Steel Pipe (Size 8 in. to but not Including 30 in.) (A 139—42)	April 8, 1943
EA—A 211	Spiral-Welded Steel or Iron Pipe (A 211—40)	Aug. 18, 1942

INDUSTRIAL EQUIPMENT

Cleaning Machine

L. & R. Mfg. Co., 54 Clinton street, Newark, N. J., is offering a new precision cleaning machine especially suitable to meet cleaning requirements in the electronics field. Dull, greasy, oil stained units emerge from the machine bone dry, and ready for the assembly line, according to the company.

Upon snapping on the thermostatic switch of the unit, a surging centrifugal motion of the basket is produced with speeds varying from high to low. The

cleaner is agitated by a powerful, air-cooled fractional horsepower motor. Its work basket is 2¼ inches in diameter by 3⅝ inches inside diameter.

Safety Handle Wheel

Gibbons Mfg. Co., Worcester, Mass., is offering a new safety handle wheel especially suitable for rapid traverse machines. It is said to prevent catching of operators clothes while wheel is in motion.

The wheel, keyed to the shaft, also allows adjustments without the use of the safety handle. According to the company, safety handle wheels can be made to replace any type of handle wheel or crank now in use.

Turn Table

Challenge Machinery Co., Grand Haven, Mich., reports the availability of a new turn table for progressive mounting of two or more units at one time and for continuous production. It also is useful to enlarge radial drill capacity and for all work where turning of the table aids manufacturing operations.

The table is furnished in two standard sizes—30 x 30-inch surface, 3 inches

thick and 42 x 42-inch surface, 4 inches thick—each surface plate having four T-slots machined from the solid.

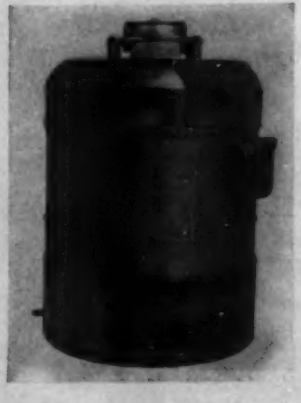
Turn tables are made in two different models—one mounted on a cast iron stand, or a low base for use on machine beds. The stand model is 34 inches high while the drill base model is 9 inches high.

A single motion locking lever locks the table to the stand securely. A special rim lock is provided on the low-base model.

Vertical Motors

General Electric Co., Schenectady, N. Y., recently introduced a new line of direct-current vertical motors ranging from 40 to 200 horsepower at 1750 revolutions per minute, and in equivalent ratings at other speeds.

Motors in the line are furnished for both constant and adjustable speeds, and are designed for low-thrust, solid-shaft applications on pumps and machine tools. They are of drip-proof, protected con-



struction, providing complete protection from dripping liquids and falling objects.

Fittings on both the upper and lower bearings simplify lubrication, and provision for the escape of excessive grease reduces the possibility of over-lubrication. A special bearing housing prevents grease from entering the motor.

The cast-iron conduit box can be arranged for bringing the leads in at the top, bottom or either side. Two hand-hole covers, removable without the use of tools, permit quick and easy inspection of the commutator end brushes.

Safety Goggle

Watchemoket Optical Co., Providence, R. I., is offering a new, general utility industrial safety goggle which features Plexiglas for lenses. The goggle is said to fit directly over prescription glasses—its full frame giving added protection

against injury from sides, top and bottom.

Lenses can be removed easily for cleaning or replacement. Frame is reinforced with metal clip at bridge; and is amply ventilated to prevent fogging. Weight of the goggle is only 1¾ ounces.

Low-Lift Truck

Baker Industrial Truck Division, Baker-Raulang Co., Cleveland, announces a new type E-2, 4000-pound low-lift truck designed to give longer hours of uninterrupted operation. It also features greater safety of operation by giving the operator better vision.

The truck, according to the company, is built on a 66-inch wheelbase and the overall length, including the operator's guard, is 123¾ inches. This permits right angle turns in aisles 67 inches wide, it is said.

The battery box has been increased in size to 32 x 39½ inches, providing space for enough additional battery capacity. The front top corner of the battery compartment is chamfered to aid vision. In addition, the cover on the battery compartment is of the sliding type, and is

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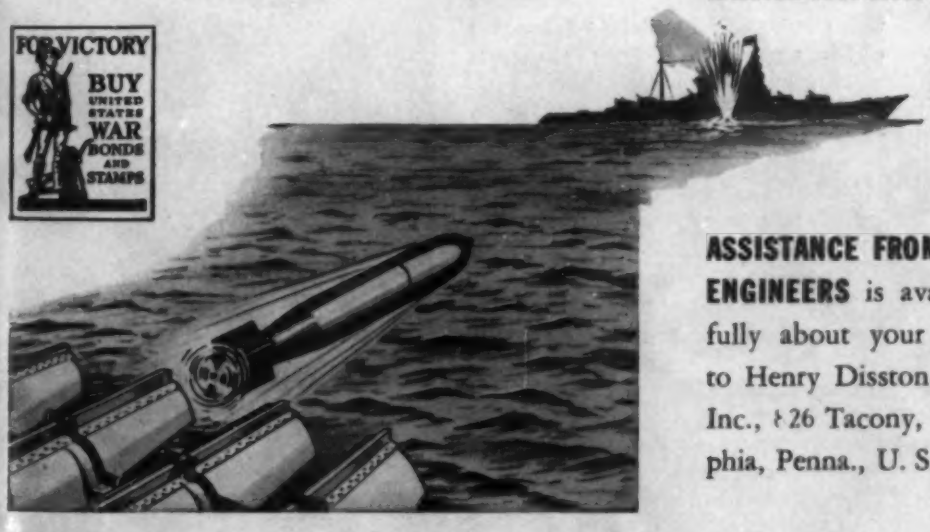
For Automatic Rifle Parts, Torpedo Parts, Gun Barrels and 37m/m Shot

This standard alloy steel of gun quality is made to Disston tool steel standards under precise control in electric furnaces. High grade raw materials, experienced personnel and up-to-date facilities are combined to produce thoroughly satisfactory steel of this type.



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equipped with handles in place of hand holes.

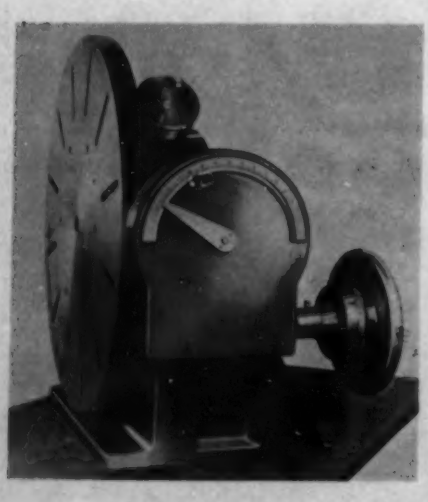
All controls, together with lift motor and pump, are in a convenient control panel. The travel brake which is located just below the control panel is ad-

justed by a single hex nut. The truck also includes such standard features as the Baker travel motor, a duplex compensating suspension which eliminates all sliding contacts between the power axle and frame and an improved hydraulic lift system.

Measuring Device

Machine Products Corp., Detroit, is introducing a new instrument for measuring large castings for radial motors. It also is used for measuring other large objects such as fixtures, patterns or fabricated parts. Called the Rotab, the instrument has a 36-inch circular table on which the work may be clamped.

Without disturbing the original clamping, an inspector can measure all the angles on the work. By means of geared turning wheels the table of the unit can be rotated to any degree and to any angle from the vertical position to the horizontal and then 30 degrees below



in the opposite direction. Dials showing degree and minute graduations register the angle of setting.

A 10-inch sine bar is provided on the instrument for use in cases where greater accuracy is required. After the table is set it may be securely locked in a fixed position—radial or angular. It may also be disengaged to rotate freely by hand.

In addition to its function as a measuring device, the unit lends itself as a holding fixture for boring mill setups, it is said. An auxiliary table, 18⅝ inches in diameter, is provided as a substitute for the 36-inch plate if needed for smaller work. The overall height of the unit, from top of table when in horizontal position, is 27⅝ inches. The base measures 20½ x 27¼ inches.

Lifting Magnet

Stearns Magnetic Mfg. Co., Milwaukee, announces a complete line of lifting magnets for loading and unloading, moving of large quantities of material quickly and for eliminating hand labor on difficult and dangerous operations.

Features of the units in the line include renewable pole shoes of alloy steel;

ribbed coil shield; unicoil construction; excellent heat dissipation.

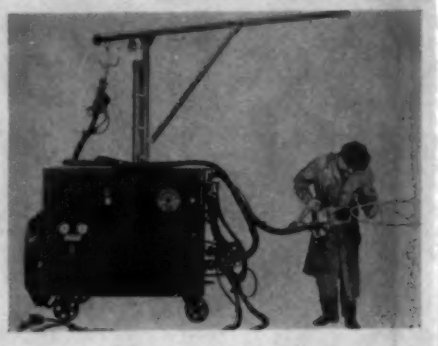
Leads and terminals are fully protected against damage and shock and are readily accessible for inspection without disturbing the insulation. Windings are vacuum impregnated to eliminate possibility of electrical trouble and are waterproof.

Repair Cart

Progressive Welder Co., Detroit, is now offering a self-contained field-repair cart for repair spot-welding of steel parts on the spot, as on airfields, for example. Equipped with an electronic timer and a wide selection of both air-operated and manual "tong" type guns, it is capable of doing just about any kind of a spot welding job on stainless and other light-gage steels, it is said.

Refrigeration of transformers, cables and guns eliminates the need for external water connections, the condensor in the "Frostrode" refrigerating unit being air cooled. The refrigerant in turn circulates a low temperature coolant through transformer, cables and guns. Thus the only connection necessary to the repair cart is a power lead.

Since the cart is provided with long cables, the connection can be made in a hangar or elsewhere. The cables are of



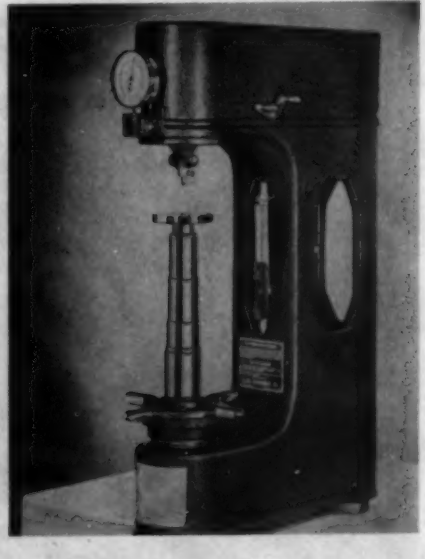
the concentric kickless type. Guns are so designed that a large variety of differently shaped electrodes may be mounted in them.

Hardness Tester

Clark Instrument Inc., Dearborn, Mich., announces an improved hardness tester for rockwell testing. Offered in three models, US8, US12 and US16, it is said to embody a number of features contributing to accuracy of measurement and speed of operation.

Among these are a frictionless spindle which provides a correct minor load at all times: Zero drag trip which eliminates friction or drag on the loading beam insuring consistent accuracy of the major load; a dial indicator adjustment affording a convenient, simple means of maintaining accuracy of readings; and in minor load adjustment.

Other features of the instrument are



fully enclosed elevating screw with self-lubricating oil reservoir, and an adjustable steady rest. The instrument is supplied complete with diamond cone penetrator and steel ball penetrators for rockwell

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testing on C scale, B scale, and most other standard rockwell scales. Three anvils are included: a standard 3⅛-inch anvil for large flat bearing surface work; a spot anvil for most standard size pieces and for use with test blocks; and a V anvil for testing cylindrical parts.

Indicating Meters

Pittsburgh Equitable Meter Co., 400 North Lexington avenue, Pittsburgh, announces its EMCO flow indicating meters, calibrated to read in litres of oxygen per minute for measuring the rate of flow of oxygen gas. It is said to provide instantaneous readings and require neither calculations nor application of correction factors.

The meter operates by the principle of a floating piston whose positioning is actuated by the flow of gas through an orifice of variable area.

The piston is lifted by the incoming gas until its weight balances the pressure loss through the orifice area. At the point of balance the flow rate may be read directly from the pointer.

The unit is compact, light in weight and easy to transport in a fitted carrying case. Four sizes of these meters are being offered to record maximum flow rates of 2,5,10 and 150 litres per minute, respectively.

Spinning Lathe

Ferracute Machine Co., Bridgeton, N. J., announces a new model spinning lathe which is said to be safer to operate due to its design—the enclosing of most moving parts. It has a single lever control of clutch and brake for instantaneous starting and stopping.

A 5-horsepower motor is used to pro-

PEARL HARBOR and priorities put many manufacturers behind the 8-ball. It became next to impossible to get brass (and other critical metals)—even for vitally needed equipment—whether torches or tanks. But many manufacturers have cured their brass headaches by turning to **ARMOR-VIT. ARMOR-VIT** is such a remarkable coating for metal it gives iron or steel many of the vital resistance properties of the scarce metals.

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vide ample power for high-speed starting and to maintain proper working speeds.

The motor has two speeds, selected by push-buttons on the motor-control panel. By use of the variable-speed adjustment, the low motor speed permits infinite selection between 200 and 500 revolutions per minute.

The high motor speed is infinitely adjustable between 400 and 1000 revolutions per minute. Higher speed range is available if desired. The motor is enclosed in a ventilated compartment. The motor-starter, providing protection from overheating of motor winding, is built-in.

Air is employed to move the tailstock spindle. One spindle-operating lever, conveniently located for right-hand control, is moved toward the work, and the spindle travels forward. Further movement, in the same direction, locks the spindle firmly. Movement of the lever away from the work unclamps the spindle and causes it to withdraw.

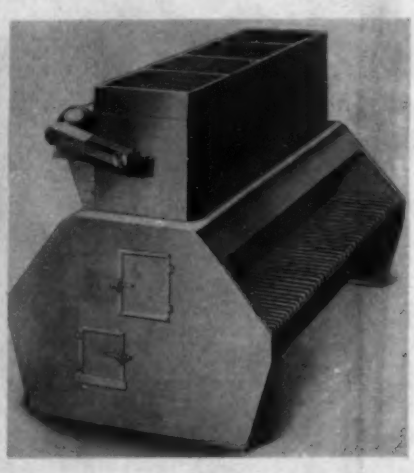
Maximum travel of the spindle is 12 inches and it can be set to any length within this range. Speed of positioning spindle is adjusted by means of a control valve. Use of tapered headstock spindle with a corresponding taper in the face plate offers a firm, true-center mounting. The two members are keyed and are held in place by a spanner nut. This provides quick removal of the face plate when desired, yet the members remain rigidly locked together while work is being done. Headstock spindle is hollow (⅝-inch bore) with standard No. 3 Morse taper for fitting center, drills or other tools.

Ventilated Bench

Claude B. Schneible Co., 3953 Laurence avenue, Chicago, reports a new multi-wash ventilated work bench for removing dust during bench operations such as grinding, filing, clipping, buffing, cleaning and polishing of iron, steel, aluminum, magnesium etc. Operators are thoroughly protected against dust and fumes created by the operations.

The bench, offered in single and double-side models, is made in any one of four arrangements. One of the double type, which accommodates workers on either side, is shown in the illustration. The two working surfaces of this bench are 10 feet long by 30 inches wide.

Space under the grates is closed by a dust hopper, which slopes to a longitudinal center tank. Air is drawn from the room and over the work by motordriven fans, located in the top of the air-washing section.



Dust particles from the operation are impelled against a set wall in the back of the bench or the wet panel below the grate and washed downward into the tank below. They also are picked up by the indrawn air and carried downward through the grates into the dust chamber, where they are impinged on the wet surfaces.

Removal of the dust is accomplished by washing the air in multi-wash collector units located within the bench. Cleansed air is discharged back into the workroom through a safety filter. Solids are flushed from the collectors and discharged into a settling tank. Water, oil

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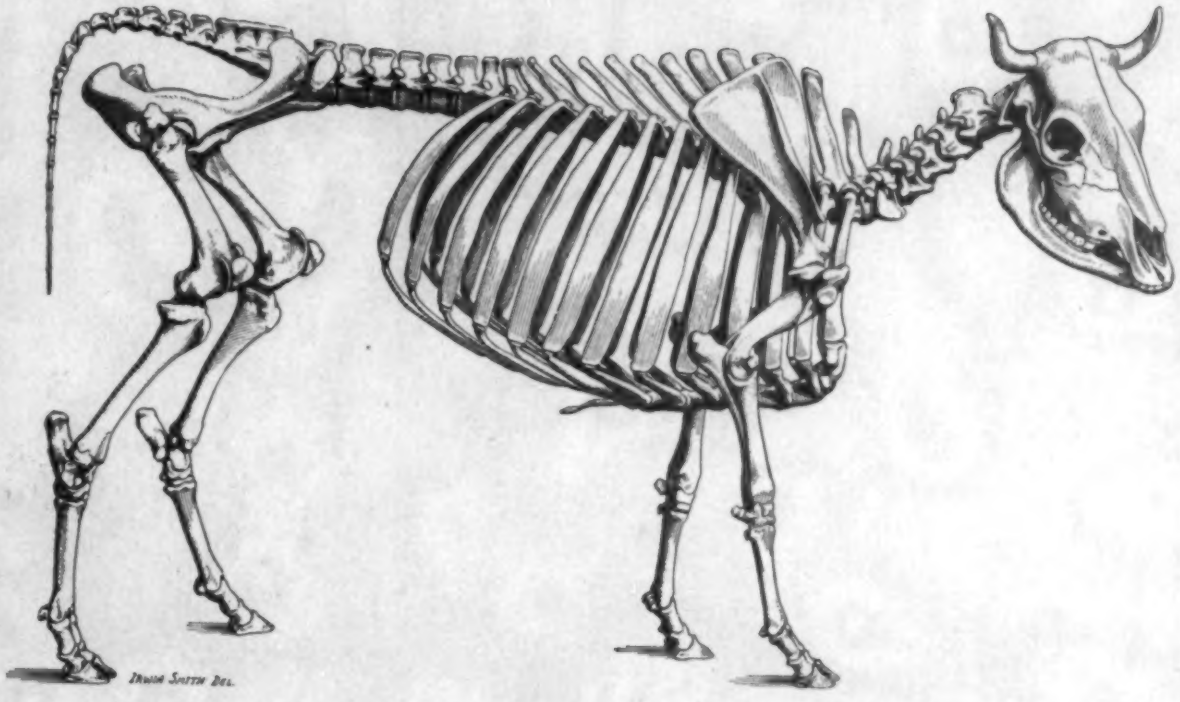

Only 47% of a steer is edible meat. The rest is bones, gristle and other inedible materials.

In the past, meat has been brought to market in carcass form. Countless tons of inedible bones and surplus fat have been transported countless miles...by railroad, ships and trucks. An enormous waste of energy and shipping space!

Today, to save precious shipping space, meat is being shipped to our armed forces abroad de-boned and de-fatted. The skeletons of the steers are being left home.

The U-boats made this change necessary. Modern, high-efficiency refrigeration made it possible.

Steaks and other de-boned cuts of meat are now pressed into compact blocks and refrigerated at low temperatures. Dependable refrigeration equipment has been provided by General Electric for this purpose.

To meet unusual war needs, enormous strides have been made in the development of General Electric *industrial refrigeration* and *air conditioning*.

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Thank you, American Locomotive, for listing our American Chain Division as one of the 445 organizations which united to build the M-7—the "tank killer." • We were pleased to find that 139 of these concerns use American Chain, in their own products, or in manufacturing them. • Friendly cooperation of business men has helped to make America great. That spirit will make us a greater nation than ever, following the war.

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or other liquid used as the cleaning medium is circulated by a vertical centrifugal pump, and may be used over and over again.

For magnesium operations, oil—preferably having a flash point of 490 degrees, a fire point of 500 degrees, and Saybolt viscosity of 6 seconds at 100 degrees Fahr.—may be used.

Centering Tool

Whitcomb Mfg. Co., 476 Eighth street, Troy, N. Y., recently placed on the market a new tool for centering round bars preliminary to machining on centers. Called the Quick-center, this tool is said to meet the need for a device that would remove the centering operation from lathes and allow inexperienced operators to center bars quickly, easily and accurately.

The machine is operated by placing the work on its V-block and turning a

handwheel until the work is held securely between a rising V-block and a lowering button. When tight, the work is in line with the center line of the spindle and the hand lever advances the center drill to the work. The operator moves only the handwheel and the lever, it is said.

The unit is equipped with a ¼-horsepower motor and has speeds of 700, 1300 and 2300 revolutions per minute adjusted by a 3-step V-belt sheave. The machine will center round bars from ⅛ inch to 3 inches in diameter within 0.005-inch.

"Let me tell you about these Murex 'Hot Rods' for mild steel"

"Murex Type F and Type FHP are my choice for horizontal and flat fillet welding, deep groove work, cover beads and other downhand work. I find both electrodes alike in performance and quality of the weld metal—except that the spiral winding of asbestos yarn on Type F makes it possible to bend the rod without injuring the coating when I have to weld in hard-to-get-at places.

"I use Fillex mostly for horizontal fillets. The weld metal forms well up the vertical leg and it's easy to turn out fillets of equal leg dimensions at high speed and without undercutting.

"All of these rods will take plenty of heat and have good penetration. The welds are smooth, and, as you can see from the table below, have good physical properties. The slag is very easy to remove.

"I find the new M & T Murex Electrode Chart a big help. It tells you when to use each Murex electrode, gives its physical properties and illustrates six ways of improving welding practice. You can get a copy by writing Metal & Thermit or asking your distributor."

MUREX ELECTRODE	AWS-ASTM Class	IDENTIFICATION		Current	POLARITY		TENSILE STRENGTH OF DEPOSIT		ELONGATION OF DEPOSIT IN 2"	
		Color Of Coating	Color On Tip		Groove Welds	Fillet Welds	As Welded (p.s.i.)	Stress Relieved (p.s.i.)	As Welded %	Stress Relieved %
TYPE F	E-6020 and E-6030	Brown (Waund)	Blue	A. C. or D. C.	Reverse	Straight	62,000 to 69,000	60,000 to 67,000	25 to 31	30 to 36
TYPE FHP	E-6020 and E-6030	Brown	Blue	A. C. or D. C.	Reverse	Straight	62,000 to 69,000	60,000 to 68,000	25 to 31	30 to 36
FILLEX	E-6020 and E-6030	Dark Brown	Blue	A. C. or D. C.	Straight	Straight	62,000 to 70,000	60,000 to 69,000	25 to 30	30 to 35

METAL & THERMIT CORPORATION

Specialists in welding for nearly 40 years. Manufacturers of Murex Electrodes for arc welding and of Thermit for repair and fabrication of heavy parts.

120 BROADWAY, NEW YORK

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To Help You Plan Now for the Competitive Days of PEACE!

The Stainless Equipment Your Customers Need Will be Lowered in Cost by the Use of IngAclad Stainless-Clad Steel

When Peace comes, this Borg-Warner Product, proved by more than 10 years in actual service, will again be ready to serve you and your customers, as it is today serving so many wartime needs.

Sharply Reduces Material Cost Yet Gives Perfect Stainless Protection on the Side that is Used!

The contact side of IngAclad is fine quality genuine stainless. The cost is naturally much lower because the stainless cladding of each sheet or plate of IngAclad is bonded to a backing of mild steel approximately 4 times the gauge of the stainless metal. Any given gauge of IngAclad, therefore, reduces by 80% the requirement of vital alloys while giving the finest non-corroding service.

IngAclad is easily fabricated by the same equipment used for mild steel. It meets a wide range of requirements in the Process Industries and is the only Stainless-Clad Steel with a record of more than 10 years in actual service. Our Engineers will be glad to discuss your fabricating problems and to cooperate with you. As producers of both Solid Stainless and Stainless-Clad Steel, we are in a position to recommend the most economical and practical material for any requirement without prejudice and without obligation.

Write for Free Manual on IngAclad Welding Procedure

We Also Produce INGERSOLL Solid Stainless Steel

INGERSOLL STEEL & DISC DIVISION
BORG-WARNER CORPORATION
310 South Michigan Avenue • Chicago, Illinois
Plants: Chicago, Ill.; New Castle, Ind.; Kalamazoo, Mich.

A Borg-Warner Product

INGACLAD
STAINLESS-CLAD STEEL

Report 16 on NE Steels

(Continued from Page 95)

ness of 277 brinell and 59 Izod impact value.

As was expected, the ductility of the rolled steel was higher. However, the castings can be judged as satisfactory in this respect.

Independently from the laboratory tests shown on the cast steel heat, additional tensile test specimens were machined and heat treated as follows: Rough turn 1¼-inch bars to 1 inch diameter, heat to 1550 degrees Fahr., quench in oil, draw at 1000 degrees Fahr., 1½ hours for specimen No. 1, 4 hours for specimens Nos. 2 and 3, finish machine to standard tensile test bar.

The tempering time of 4 hours improved the ductility as shown on bars Nos. 2 and 3 in Table II with but negligible loss in hardness.

Machining of the cast gear blanks progressed well with good results reported by the shop as to cutting qualities, feeds and speeds. Out of 14 castings, we had no rejections due to quality of the material. From 0.010 to 0.020-inch stock was sufficient for the finish grind operations after heat treatment.

Electric Furnace Treated

Heat treating was done in an electric furnace to the following specifications: Quench in oil from 1550 degrees Fahr., temper at 400 to 425 degrees Fahr. (4 hours). Hardness readings averaged 52 rockwell C about 1/16-inch from the tooth flank near the pitch line to 49 at the root diameter as compared to 53 and 50 rockwell respectively on gears made from forgings.

Average growth in outside diameter due to heat treatment on a 9½-inch diameter gear was recorded as 0.005-inch on the limited number of castings on hand as against 0.008-inch on SAE-4140 and 0.010-inch on SAE-3140, value obtained from several hundred gears made from forging stock.

The supply of forgings has improved in the last few weeks to such an extent to take care of our production requirements, giving us an opportunity to test two hoists, equipped with the heat-treated cast steel gears under actual working conditions. These have now been in operation for about 10 weeks without failure or undue indication of wear.

An analysis of costs showed the castings to be about 10 per cent higher than forgings (disregarding pattern or die equipment) and the finished gears about 15 per cent above the finished product made from forgings. Of course these figures might vary considerably if a

larger number of heats and castings had been checked. However, with the proper care in controlling the chemical properties, and foundry molding and pouring practice, a good uniform casting should be obtainable.

Making such steel castings by the centrifugal process would undoubtedly produce a more homogeneous and refined product. The beneficial effect of improved metal flow lines and working of the fibers produced in rolling and forging will be lost but might be offset to some extent with scientific developments in the art of casting alloy steels.

We are confident that under similar loads, working conditions, similar size and shape of parts as described herein, cast alloy steel gears, heat treated to the proper hardness can be used successfully, particularly where production quantities do not warrant the expense of making forging dies.

Tank Components

(*Continued from Page* 102)

ferable for drilling than for milling operations for instance. In trying to arrive at the best all around steel specifically for end connections, it is felt that a structure which is basically lamellar pearlite with a minimum amount of spheroidizing is desirable.

It must be kept in mind that the hardness of the part is no direct criterion of the structure. On the other hand, if the structure is correct, the hardness will range between 179 and 207 brinell. All hardness readings should be taken through a cross-section of the part to avoid such errors as might result from decarburization or incomplete transformation at the core.

Procedures: In considering annealing procedures to arrive at a part with the hardness range of 179 to 207 brinell, which is largely lamellar pearlite with a minimum amount of spheroidizing, it was concluded that no single method would work for all types of equipment. Accompanying curves illustrate some cycles that have proved satisfactory.

Such curves vary greatly with the loading of the furnace, rate of firing, mass of the furnace, etc. In this connection, it is suggested that considerable care be taken not to overload a furnace to the extent that a non-uniform heat might be obtained within a given load.

The curves shown are plotted for WD-1345 steel. While it is felt that the transformations are more easily obtainable on WD-9445 steel than on WD-1345 steel, it is suggested that the same practice be followed for both so as to eliminate necessity for segregating forgings and the confusion that might result.

Hardening and Quenching End Con-

NOTE:
Baker has re-designed many of its trucks to meet Industry's needs for increased production:
1. Longer continuous operation.
2. Faster handling
3. Lower maintenance.
Baker

NEW-
Baker
Low Lift
TRUCKS

For Increased Production and Efficiency

Another forward step in providing faster, safer, and better movement of material has been made by Baker Trucks. This new Low-Lift model, designated as Type E-3, is of 6000 lb. capacity. The improvements consist of hydraulic lift, increased battery capacity permitting longer continuous operation, chamfered front top corner of battery compartment improving driver's visibility, operator's guard integral with frame for greater strength and safety, and other features which provide increased efficiency and easier maintenance ... The new improved design is also available in 4000 lb. capacity (Type E-2). Write for complete information.

NEW Baker Low-Lift Truck has these advantages:

1. Hydraulic lift system proved by experience in other Baker Trucks, providing positive control of hoisting and lowering.
2. Larger battery box (32" x 39½") permitting enough additional battery capacity so that trucks can be operated continuously for longer shifts.
3. Streamlined design of battery compartment providing greater visibility for operator.
4. Sliding type battery cover equipped with handles for faster servicing.
5. Operator's guard built integral with frame for greater strength and safety and improved appearance.
6. Handy compartment for carrying towing chain, pinch bar, or other tools.
7. Controls in a conveniently accessible panel providing easy maintenance.
8. Alloy-steel trailing axle firmly anchored to frame, wheels steering on anti-friction bearings. Box-section frame to withstand strains and minimize maintenance.
9. Single hex nut for adjusting travel brake located where it can be easily reached.
10. Standard Baker-built travel motor, and exclusive Baker Duplex-Compensating Suspension for smoother running and longer life.

BAKER INDUSTRIAL TRUCK DIVISION of the Baker-Raulang Company
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IIIB-1A-43

Baker INDUSTRIAL TRUCKS

BUSINESS MUST BE FREE— FOR FREE PEOPLE

★ We in this country have enjoyed the "Four Freedoms" for so long that perhaps we forget the existence of these Freedoms —and their maintenance through the years—has been largely the economic result of a Free Enterprise System.

When business is free to plan ahead, to dare, and to risk with faith in the future—with faith in the possibility of a reasonable profit, all the people benefit! When the imagination and inventive genius of industry can forge ahead with new production methods, develop new products, and invade new markets—then mass employment and the Four Freedoms are assured.

Free Enterprise, spurred on by the Profit Motive, and operating under our traditional American Way of Life, has constantly raised the living standards of millions, created new jobs, kept wages and salaries rising, and cut the cost to the consumer of goods produced.

No dictator ever arose in a healthy, prosperous civilian economy. None ever will. Only industrial stagnation breeds those unhealthy forces of discontent that alone lead men to the destruction of their own Four Freedoms.

Industrial progress promotes Freedom, when industry in turn is free of hampering government regimentation. Government must *encourage* industrial progress, not handicap its development. Repression is foreign to the conception of free people. And, because appreciation comes only from knowledge and understanding, we in Industry must explain these benefits of Free Enterprise to those who may not understand them today.

CURTIS PNEUMATIC MACHINERY DIVISION
of Curtis Manufacturing Company
1996 Kienlen Avenue • St. Louis, Mo.

FOR VICTORY BUY UNITED STATES WAR BONDS AND STAMPS

Compressors — Air Hoists — Air Cylinders

nectors: Considerable variation in hardening practices results from types of equipment, loading practices, firing rates and the like. Also hardening practice varies for different steels. However, the following general recommendations will serve as a guide.

Hardness of a forging as quenched and before draw should be a minimum of 477 brinell—the so-called 80 per cent martensitic hardness. This hardness should exist at the center of any cross-section and therefore the test must be made in a cutaway section in determining proper practice. If this minimum hardness has not been obtained, empirical work must be done to determine the necessary change in methods.

Salient Points on Quenching

Quenching oil should be maintained at a uniform temperature. This temperature should be selected by the heat treater for whatever oil is in use. The viscosity curve for the oil should be obtained from the supplier and the temperature to be used, in order to obtain the highest cooling rate, should be within the range of the two sharp changes in curvature of the curve. In general, an oil ranging from 80 to 100 saybolt seconds viscosity at 100 degrees Fahr. should prove satisfactory.

It should be noted that all hardness checks on end connections must be taken beneath any scale or decarburized area that may result from processing.

The following procedure has been found satisfactory for hardening WD-1345 end connections:

—Heat to 1550 degrees Fahr. and hold at heat for 30 to 45 minutes.

—Quench in oil immediately at the oil temperature giving maximum cooling rate.

—Draw at 950 degrees Fahr. for 1 hour.

It must be appreciated that these treatments would have to be modified depending upon whether salt bath, open hearth, muffled box type or other types of furnaces are used. General procedure should be as follows:

Harden to a minimum of 477 brinell at the core and then draw to the specified range of 331 to 375, varying the time and temperature as required to obtain an *even hardness throughout a section* of the machined forging.

Machining Procedures: Generally when machining WD-1345 or comparable steel, it is necessary to decrease the revolutions per minute and accordingly the surface feet per minute. However, the feed can be increased to compensate for slower surface speed so as to obtain approximately the same machined production.

Failure to consistently sharpen machin-

ing tools uniformly and frequently can cause trouble. Cases of drills jamming in holes and breaking off in forgings were believed caused by leading edges of the drill being worn down to a taper due to infrequent sharpening. For those making their own tools, it is suggested that a less acute angle on the entering point of drill improves drilling results. It would be well to carry on some experimental work of this type to alleviate any difficulties.

Revision of Steel Analyses: The question of decreasing the carbon content is largely one of ability to meet the physical requirements of the Ordnance Department with lower carbon steel. In any event, a change in the carbon content alone would not alter materially the necessity for annealing all forgings prior to machining.

General Conclusions: All WD-9445 or WD-1345 steel end connectors, end plates or wedges should be annealed by a suitable treatment to obtain a metal in the hardness range of 179 to 207 brinell with a lamellar pearlitic structure and with a minimum amount of spheroidization.

Forgings should be coded by the forging companies with some marking to indicate the type of steel used, so that they can be properly segregated for variation in heat-treating practice.

Allis-Chalmers Publishes 1942 Annual Review

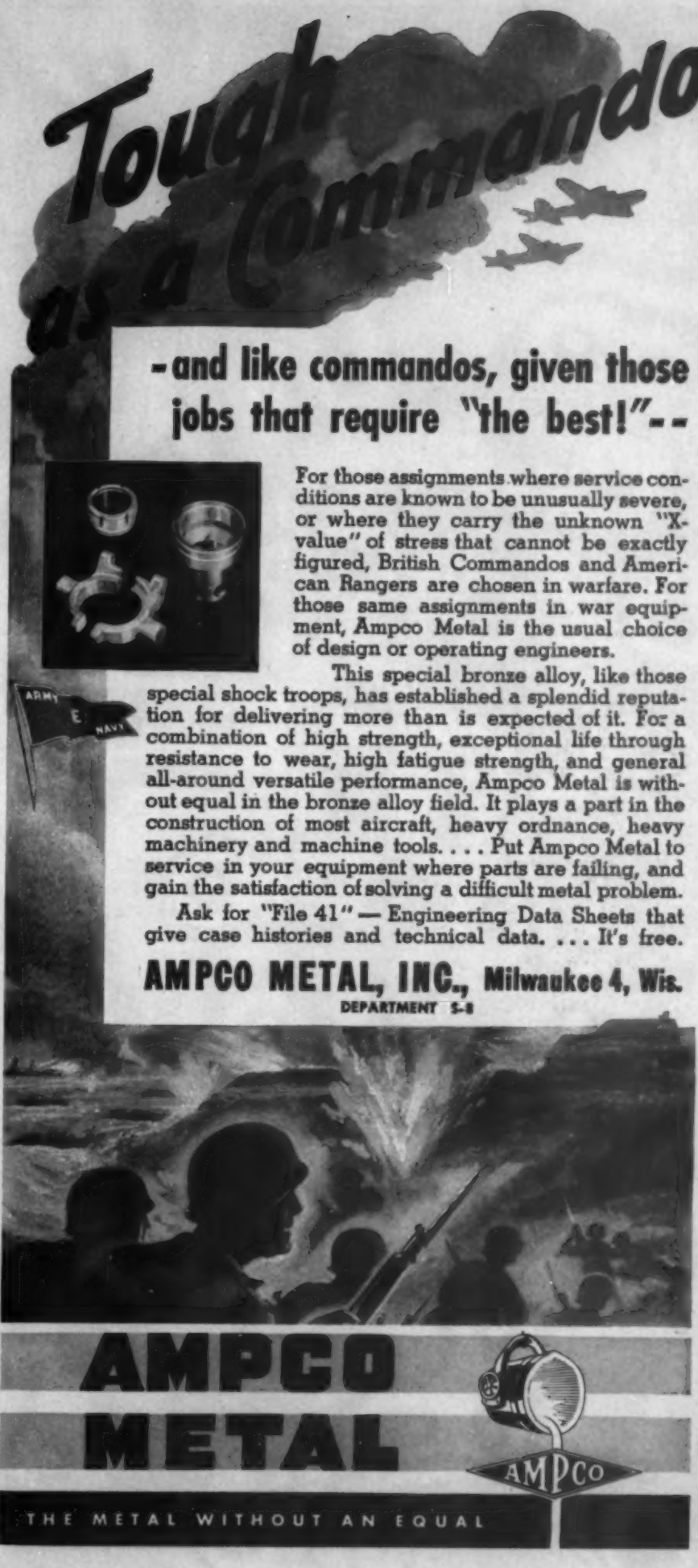
Allis-Chalmers Mfg. Co., Milwaukee, reports once again it has issued its annual review of Allis-Chalmers engineering progress—the 1942 edition.

Smaller, but as complete as last year's, the annual contains some 212 drawings and photographs in addition to a much condensed text. The publication was published with the approval of the Army, Navy, Army Air Forces and the Maritime Commission.

Company Museums, How To Make and Manage

Company Museums, by Laurence Vail Coleman; cloth, 173 pages, 6 x 9 inches; published by the American Association of Museums, Washington, for $2.50.

The author's purpose is to show the nature and usefulness of company museums and to aid those who have such museums to manage. Purpose of most of these collections is for business reference and public relations. An appendix contains descriptions of 80 such museums in the United States and three in Canada. The volume is of great interest to companies and officers having such collections.


Tough as a Commando
-and like commandos, given those jobs that require "the best!"--
For those assignments where service conditions are known to be unusually severe, or where they carry the unknown "X-value" of stress that cannot be exactly figured, British Commandos and American Rangers are chosen in warfare. For those same assignments in war equipment, Ampco Metal is the usual choice of design or operating engineers.
This special bronze alloy, like those special shock troops, has established a splendid reputation for delivering more than is expected of it. For a combination of high strength, exceptional life through resistance to wear, high fatigue strength, and general all-around versatile performance, Ampco Metal is without equal in the bronze alloy field. It plays a part in the construction of most aircraft, heavy ordnance, heavy machinery and machine tools. . . . Put Ampco Metal to service in your equipment where parts are failing, and gain the satisfaction of solving a difficult metal problem.
Ask for "File 41" — Engineering Data Sheets that give case histories and technical data. . . . It's free.
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THE METAL WITHOUT AN EQUAL

Brushing Wheels

(*Continued from Page* 110)

the application of a disk center section brushing wheel, 6 inches in diameter and ⅝-inch thick, with a ½-inch arbor hole. The 0.029-inch wire in this brush is twisted into tufts. The brush is run at 4000 to 6000 revolutions per minute on an electric or air tool.

Because of the bulkheading, shipbuilders are confronted by many welded corners that are difficult to reach by ordinary weld cleaning methods. For this purpose a heavy-duty end brush is being used with singular success. The heavy wire in this brush is ostensibly an extension of the shaft. Run on a portable air or electric tool at 4200 revolutions per minute, and held at an angle of 45 degrees to the work, the wire ends bite hard and rapidly into the weld scale.

To remove slag from flat surface welds, the Osborn technical men prescribed a double-row cup brush, 6 inches in diameter with a ⅝-inch arbor hole. The brush contains 0.035-inch special analysis wire.

Stress Concentration Points Eliminated

Although the removal of burrs is highly essential in every metal working plant, it is most important in the airplane industry. Removal of burrs is required for practically everything that goes into an airplane, whose parts are either stamped, sawed, routed or machined. For practically every one of these operations a power brush can be specified.

Brushing wheels are being applied to ailerons, gun turrets, landing gears, panel assemblies, instruments, plumbing and electrical equipment, propeller, wing tips and self-sealing gasoline tanks. They are used to roughen the surface of each laminated sheet of rubber going into the tanks, in order to increase the cohesion.

By rounding corners, blending surfaces and removing burrs and tool marks on highly stressed parts, brushing wheels eliminate stress concentration points where dangerous fractures may originate and possibly lead a plane to disaster. On a crankshaft alone there may be as many as 158 possible locations for points of stress concentration.

In addition to increasing the resistance of highly stressed parts to fracture, brushing wheels are helping airplane engine builders achieve closer tolerance and construct airplanes with greater operating efficiency. Certain brushing wheels enhance the workability of precisely machined parts, by improving their friction characteristic even to the point of preparing surfaces to hold lubrication.

One of the most meticulous jobs in

Debunking Globaloney

ABOUT "UNIVERSAL" OVERLOAD RELAYS

There is no universal overload relay which will provide complete motor protection under all extremes of temperature found on the globe. A variety of thermal elements is needed for universal overload protection.

Therefore a simple type of relay, like the Allen-Bradley resisto-therm, will satisfy 98% of industrial requirements. Only where a starter is subjected to very wide temperature changes does the universal (compensated) relay offer tangible advantages. Such installations are not an everyday problem . . . hence, the relay with the fewest parts . . . like the A-B resisto-therm . . . is the ideal overload relay.

The following table presents a picture of overload relay performance under various atmospheric temperature conditions. Whether you use resisto-therm or "universal" relays, you must analyze installation conditions and select the correct thermal element for reliable motor protection.

HOW TO SELECT THE OVERLOAD RELAY FOR BEST PROTECTION UNDER VARIOUS TEMPERATURE CONDITIONS

Atmospheric temperature at motor	**Atmospheric temperature at starter**	**Relay**
NORMAL	NORMAL	Specify resisto-therm relay because of its simplicity. "Universal" type contributes nothing toward improved protection.
Considerably ABOVE NORMAL (A very common condition)	NORMAL	Specify resisto-therm relay. "Universal" relay may permit motor to reach a dangerous temperature, because it operates on current only and does not consider effect of high atmospheric temperature in which motor is operating.
Considerably BELOW NORMAL	NORMAL	Specify resisto-therm relay because it permits motor to carry any safe load but protects it against overheating. "Universal" relay, operating on current only, will not permit motor to do a wartime job.

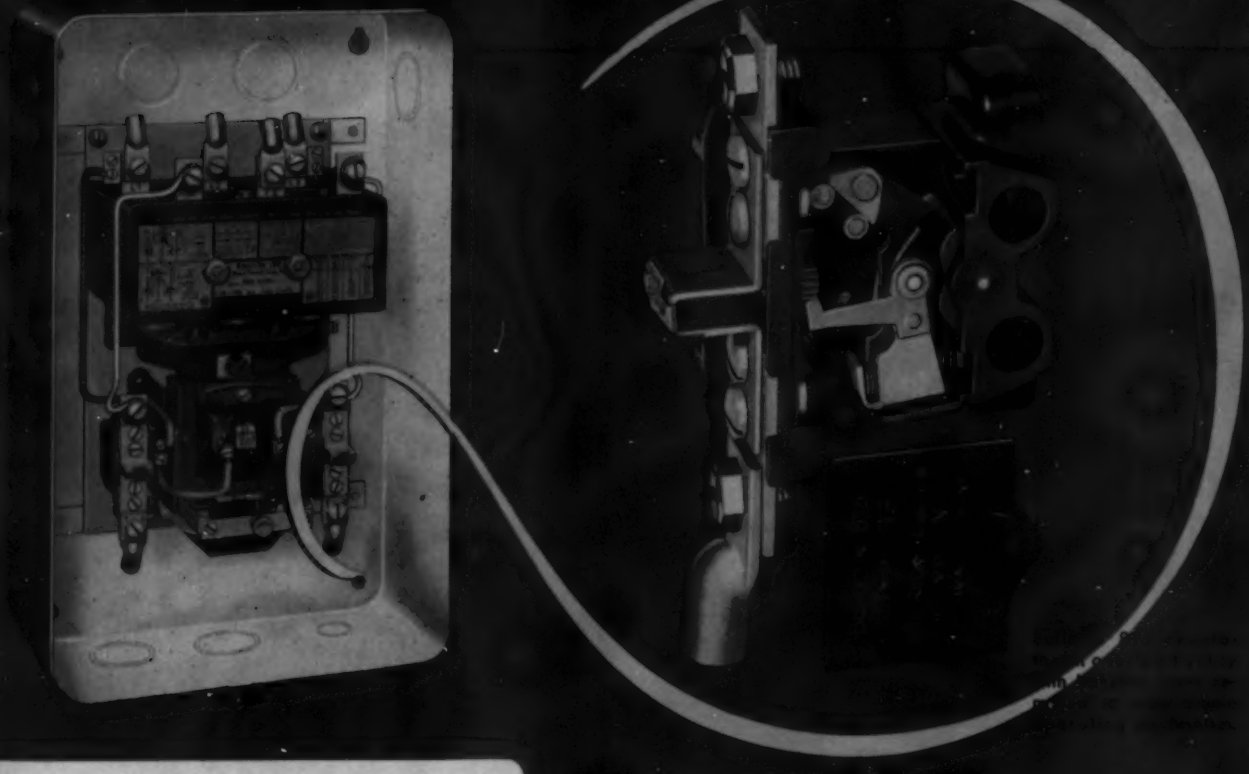
ALLEN-BRADLEY

OVERLOAD RELAYS

QUALITY

PROTECT YOUR MOTORS

with simple but reliable relays



FOR HIGHER CAPACITIES

INDUCTO-THERM TYPE

Cross-section of Bulletin 820 overload relay, adjustable over a wide range of tripping values. Used with the larger motor starters.

COMBINATION MAGNETIC INDUCTO-THERM TYPE

Bulletin 821 overload relay combines advantages of magnetic and inducto-therm relays for high tension starters.

MAGNETIC TYPE

Bulletin 810 overload relay, showing dashpot construction, is ideal where motors are liable to stall.

ALLEN-BRADLEY

SOLENOID MOTOR CONTROL

QUALITY

the brushing of engine parts was the elimination of sharp corners and the blending of surfaces on the ball ends of push rods. Each rod is about as large as the end of your little finger. Into the center of the ball is drilled an oil hole about 1/16-inch in diameter in size.

The drill always leaves a sharp corner or burr, and if the corner is not carefully radiused and the surfaces blended, the ball end may become the site of a stress concentration point, where a fracture originates.

Before Osborn studied the job, the work of finishing this vital engine part was done laboriously and slowly by hand with the use of powdered emery and a cloth.

This method, however, was not uniformly successful for it often distorted the shape of the ball end, and the part had to be rejected.

Brushes Reach All Areas

It was found that this job could be quickly and effectively done with a radial brushing wheel of Tampico fiber. The push rod end, when applied to the brush, is placed inside a cup on the end of a wooden or metal fixture. While the brush revolves against the metal at a speed of 2400 revolutions per minute, the push rod end rotates. Careful profilometer tests show that the surface accuracy is kept within four millionths of an inch. By this method about five pieces are finished in a minute.

Brushes of Tampico fiber, see Fig 2, are being given many important jobs in the manufacture of aircraft engines. The fibers of the brush reach areas that cannot adequately be reached by other methods. In the manufacture of very small parts of machines they are most helpful. See Fig. 3.

The secret of the brushing wheel lies in the flexibility of the material being applied against the surfaces under treatment.

Their inherent flexibility is easily controlled by varying the fill material in the wheel, the density of the fill, length of trim, wheel diameter, auxiliary abrasive material or operating speed. *These qualities permit a degree of effectiveness impossible in other burr removing mediums because the action on the parts being brushed can be varied so widely.*

In many plants, the effectiveness of the brushing wheel is also being enhanced by mounting them on machines with several brushing stations. In one plant piston heads are being brushed in this manner.

Some of the many jobs in which brushing wheels have to be specified are shown in Table I.

You get accurate, dependable results and SAVE A LOT OF MONEY —with the Delta Carbide Tool Grinder . . .

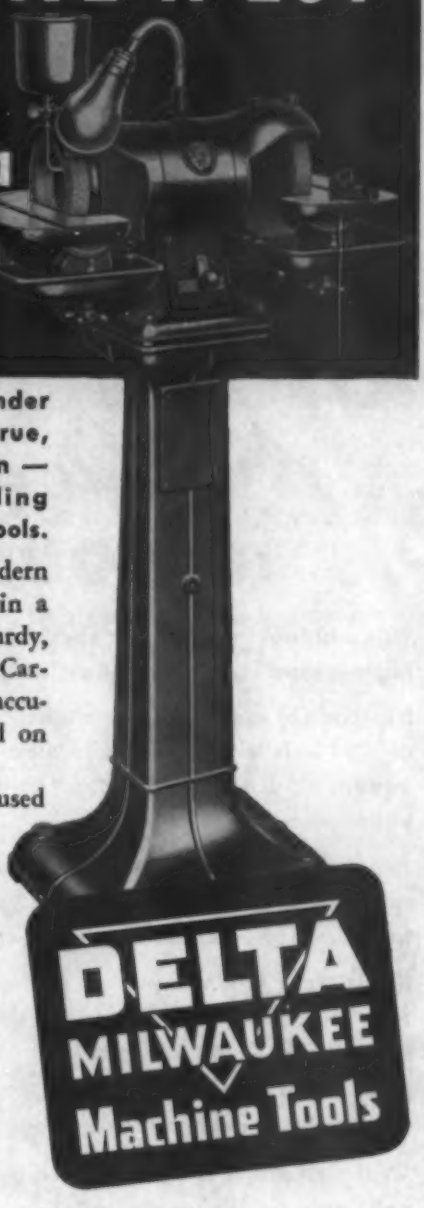
This low-cost grinder runs absolutely true, free from vibration — for delicate grinding of carbide tipped tools.

Manufactured by modern precision methods in a modern plant, this sturdy, vibrationless Delta Carbide Tool Grinder is so well-built, so accurately machined that you can depend on especially fine results.

It is so low in cost that it can be used profitably in *any* shop — large or small. Combined with the Delta standard tool grinder for hogging down the shank steel, it gives you a perfect working combination for sharpening tungsten carbide tools, with a remarkably small initial investment.

Many outstanding features to assure accuracy and long life

Motor of reversible type; equipped with self-sealed ball bearings which never require lubrication. Manually-operated brakes on each wheel. One 60-grit and one 120-grit wheel; surface speed 5200 f.p.m. Grinder also takes standard diamond wheels; has convenient water pot. Heavy, accurately ground tables. Entire sub-base quickly, easily removed for cleaning out sludge.



Widely used in war plants, this good-looking, modern machine has made a record for itself wherever it has been installed. Get credit for discovering the low-cost Delta way in *your* plant. Investigate! Send for the new Delta catalog today.

M-2B

TEAR OUT AND MAIL THIS COUPON

THE DELTA MANUFACTURING CO.
702H E. Vienna Ave., Milwaukee 1, Wis.

Please send me your new catalog giving full details on the Delta Carbide Tool Grinder and your full line of low-cost machine tools.

Name..... Position.....

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City..... (.....) State.....
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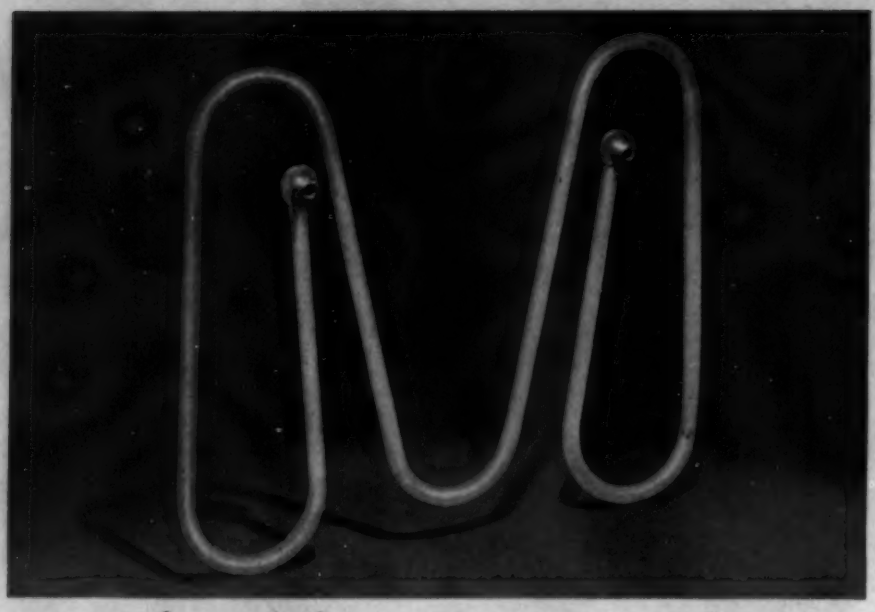
Reversing Switch Conveniently located at front of grinder. Six-pole type, completely wired into the unit. Opens both sides of line.



Anything like this

IN YOUR PLANT?

This odd-looking thing is a specially fabricated tubular part used in sterilizing equipment for Army field hospitals.

It is made of seamless copper tube, ⅝" in diameter and has a wall thickness of .035". After the part is formed to the desired shape (specified by the customer), special cast bronze fittings are brazed to both ends. Then the entire piece is electro-tin-plated.

Required for a definite purpose, it was designed by the user in collaboration with Wolverine tube-fabricating engineers. All specifications are being met and the job is in production.

If this piece reminds you of a similar problem of yours involving tube or tubular parts, call Wolverine Tube Division for consultation and quotation. We have hundreds of standard tools already on hand for making parts and assemblies similar to the part shown here, along with a wealth of experience in handling seamless tube.

Or if you prefer to make the part yourself, call on Wolverine anyway as a source for tube that will be uniformly high in quality and possess the right properties for fabricating. Also consult our engineers regarding types of tools, methods, and techniques. Their talents and services are yours for no cost.

DEFINITIONS

Extrusion Block—a cylindrical piece of cast metal—copper or brass—which has been cut from the original billet and prepared for extruding into seamless tube.

• *Our new address is Detroit 9, Mich.*

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CALUMET AND HECLA CONSOLIDATED COPPER COMPANY

WOLVERINE TUBE DIVISION

Seamless Copper — Brass

1439 CENTRAL AVENUE DETROIT, MICHIGAN

Coke Oven Doors

(*Continued from Page* 114)

given toward expediting the welding process and increasing production. As previously mentioned, we have three electric welding machines; however, two of the machines are in continual use for repair and maintenance work, allowing only one to be used in the welding of the doors. Therefore, to increase production, it was necessary either to purchase more electric welding machines or hire more welders and operate on the 4 p.m. to midnight shift. The latter was adopted. Three student welders with 400 to 500 class hours to their credit were hired. As soon as their welding was satisfactory these welders were put on the afternoon shift, 4 p.m. to 12 midnight.

This arrangement allowed a separate welding machine for each welder without interference from maintenance welding. Two welders were used in the welding of these doors, while the third welder was used for welding the ¾-inch round bars to the 1 x 3½-inch bars. The third welder also took charge of the assembling and welding of the bumper plates, which as shown in Fig 1-B, consist of two ½-inch plates welded together with a 1-inch bar in the back which acts as a stiffener for these plates when welded to the door. This welder also assisted in welding number plates and ends on the doors.

Output—Two Doors Per Day

With these seven men, a boilermaker, a boilermaker's helper, and five welders, working on the doors two shifts per day the production of these doors increased steadily until it averaged two completed doors per day.

Welding rod used per door was 20 pounds of 5/32-inch No. 5 coated fleet weld electric welding rod and 30 pounds of 3/16-inch No. 5 coated fleet weld electric welding rod.

The use of relatively inexperienced welders on this type of project, which, under previous practices, necessitated the use of experienced welders was made possible by the simple arrangement for handling the doors. This arrangement allows two or more welders to work together, and at all times to weld in a natural horizontal position, thus greatly simplifying the welding process.

As previously stated the bids received for the 48 coke oven doors were $9600—jobsite; $6720—f.o.b. Johnstown, Pa.; and $12,480—f.o.b., Los Angeles. The freight charge from Johnstown, Pa. is $1.43 per cwt making a total freight charge of $1,067.35 which would bring the total cost for the 48 oven doors to $7,787.35. The freight charge from Los Angeles is $.66 cwt, making a total

freight charge of $492.62 and bringing the total cost for the 48 coke oven doors to $12,972.62.

The total labor cost was $1,740.12. The cost of material was approximately $75 per door, or $3,600 for the 48 doors, making a total cost of $5,340.12 for the 48 coke oven doors manufactured at this plant. The nearest bid was $7,787.35, jobsite.

The difference between the two costs was $2,447.23, or a saving of 31.43 per cent which was made possible by the unique arrangement devised for handling the doors while they were being welded.

Average cost per fabricated steel coke oven door was $110.25. This compares favorably with the cost of the cast iron coke oven door which originally was purchased. The cost of those purchased was $179.44 per coke side door and $262.00 per pusher side door. As these values were given in 1936, it is fair to assume that the cost of labor and materials since have increased 20 per cent. This would bring the cost of the doors to $215.33 and $315.60, respectively. Using the foregoing figures, the percentage of saving is 94.4 per cent and 186 per cent, respectively.

Labor cost for the first completed door was $96.72; the total cost was approximately $171.72. The high labor cost for the first day was due to the lack of welding experience of the men, and to the new type of work which they were performing. As the men became better acquainted with their work, the labor cost took a decided drop; and as more men were employed to allow the operation of two shifts, this drop continued until the labor cost per door was decreased to $24.48. The cost per completed door declined from $171.72 to $99.48, a reduction of $72.24 or 42 per cent per door. During the final 5-day period, ten coke oven doors were completed at a cost for labor of $244.80. The average labor cost per door for the 48 doors was $36.25.

Flexrock Develops New Oil-Resisting Material

A new industrial floor material, called AWOG, developed recently by Flexrock Co., 2330 Manning street, Philadelphia, is reported to resist the penetration of acid, water, oil and grease. In addition to its imperviousness, it is said to present new properties in durability—is smooth and dustless.

The material withstands heavy traffic and punishing use—such as the rolling of drums and barrels and the grinding steel wheels of heavily laden trucks. It can be used for new floors; for overlays on concrete, brick, stone or wood; for repairing and resurfacing areas of any size, according to the company.

"DOWN TO THE SEA"

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EUCLID CRANES

BUILDING that "Bridge of Ships to Berlin" to hasten the prompt, unconditional surrender of the Axis is America's biggest job today! Cooperating to the fullest extent in this nationwide effort, are the shipyards of The Lancaster Iron Works at Perryville, Maryland.

It is here that a 60 ft. EUCLID CRANE operates continuously, occasionally 12 hours per day, lifting heavy boat sections . . . speeding Victory Ships "Down to the Sea".

In War as in Peace, EUCLID CRANES AND HOISTS play a major role in production speedups because of their inherent ability to render long, trouble-free service with minimum attention and upkeep cost.

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THE EUCLID CRANE & HOIST CO.
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ASTM New Standards

(*Continued from Page* 119)

terial (A 261-43 T)". These specifications were developed to afford relief to many users of high-strength bolting materials who were not able to procure the types of alloy steels customarily used.

Committee A-1 on Steel in outlining some of its pending work reported the drafting of a specification to cover carbon-steel seamless drum forgings. A special section is investigating recommended procedure for magnetic particle testing of heavy forgings; there is also considerable interest on the part of the steel foundry industry in a standard test. A joint project of Committee A-1 and the ASTM group on stainless steels (A-10) is working on stainless pressure tubing specifications and is drafting in ASTM style four specifications issued by the American Iron & Steel Institute.

Work involving purchase standards for clad material—the homogeneous binding to a heavier steel plate of a thin layer of stainless material—will result during the summer in three new ASTM specifications covering chromium, chromium nickel and nickel-clad plates.

Two reports presented at the meeting were of particular significance from the standpoint of corrosion, the report of A-5 on Corrosion of Iron and Steel giving the latest information in the form of extensive tabular data on the country-wide exposure tests of wire and wire products involving barbed wire, farm fencing, chain link fence, and so forth. The results after ten years' exposure of Nonferrous Metals and Alloys includes some 24 widely used metals and alloys. Each committee will, during the coming year, analyze these data and may then be prepared to offer comments on their significance.

The Research Committee on Fatigue of Metals in its second progress report on the effect of size of specimens on fatigue strength of three types of steel describes further tests on the effect of size on the fatigue strength of notched specimens of two plain carbon steels (SAE-1020 and SAE-1035) and on one heat-treated chromium molybdenum steel (SAE-X4130). Results of these tests have been correlated with the results of tests of unnotched specimens of the same steels reported last year. These tests show the tendency for the endurance limit of steel tested to become constant for notched specimens 1 inch in diameter and larger. This was in harmony with the results reported last year for unnotched specimens.

Advise Tests for Larger Sizes

The committee points out that it is highly desirable that this result be checked by tests of still larger specimens along with corresponding tests of smaller specimens, taking care to reduce variation in surface conditions and differences in strength due to radio variations of strength within the bars of the metal.

Comparisons of theoretical and actual reductions of fatigue strength by notches were made and it was found that the steels tested came near to following the maximum distortion-energy theory (sometimes called the maximum shear strain-energy theory) than to following the common maximum stress theory or maximum shear-stress theory.

A diagram was developed intended to facilitate approximate estimating of endurance limits of members of any size if the endurance limit of a geometrically similar specimen of the same metal but of a different size is known.

The Joint Committee on Filler Metal of the American Welding Society and the American Society for Testing Materials has established tentative specifications for aluminum and aluminum alloy metal arc welding electrodes. This is a new tentative standard (B 184-45T).

Other standards under preparation in-

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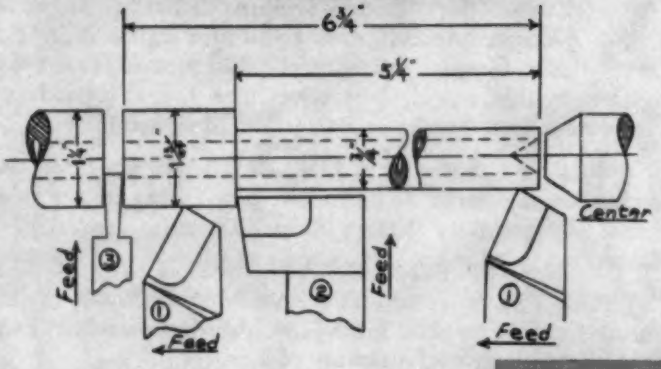

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The material was 18-8 stainless steel tubing (2.5 manganese). The operation employed feeds of—tool No. (1) .010"/Rev., tool No. (2) hand feed, tool No. (3) .004"/Rev. The tools that were used in this operation are illustrated.

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clude specifications for stainless steel arc welding electrodes for welding steels of high hardenability and specifications for nickel and nickel alloy filler metal.

Committee A-3 on cast iron has recommended that the ASTM, as one of the sponsors of Sectional Committee A-21 on Specifications for Cast Iron Pipe and Fittings, indorse the submittal of the specifications for threaded cast iron pipe to the American Standards Association for approval as American standards.

Committee A-6 on Magnetic Properties reports tentative revisions of standards, including a new name for Magnaflux not subject to copyright limitations. The phrase chosen is "Magnetic Particle Method". A definition for "Apparent Power, P_a" and a number of new symbols are being recommended for publication as tentative.

Subcommittee 3 on Direct Current Test Methods (under Committee A-6) reports a third method of testing feebly magnetic materials developed by Leeds & Northrup Co. is under consideration for approval as tentative. This method is in commercial use and for certain applications offers advantages over those included in "Tentative Method of Test for Permeability of Feebly Magnetic Materials (A 259-42 T)".

Subcommittee IV on Alternating Current Test Methods is combining "Tentative Method A 258-42T" dealing with incremental magnetic properties with "Standard Methods of Test for Magnetic Properties of Iron and Steel A 34-42" to eliminate certain duplication and provide a better low-induction test method.

Study Core Loss Data

Because many important applications of power supply with frequencies up to 10,000 cycles per second are now being used for induction heating and similar applications, a demand for higher frequency core loss data on electrical sheet has caused this committee to undertake the preparation of procedure for measuring core loss at frequencies up to 10,000 cycles per second. This will probably be a watt meter method with special precautions for reducing and determining the instrument errors due to these high frequencies. Another difficulty will be the very considerable heating of the samples at the higher frequencies and inductions. As a preliminary step, a small number of sheet samples will be circulated between a few laboratories equipped to make such tests in order to determine whether good agreement can be readily obtained. If appreciable discrepancies develop, this will indicate the necessity for taking greater precautions than are now customary. With magnetic core temperatures now often exceeding 100 degrees Cent., the question has been raised concerning the effect on aging

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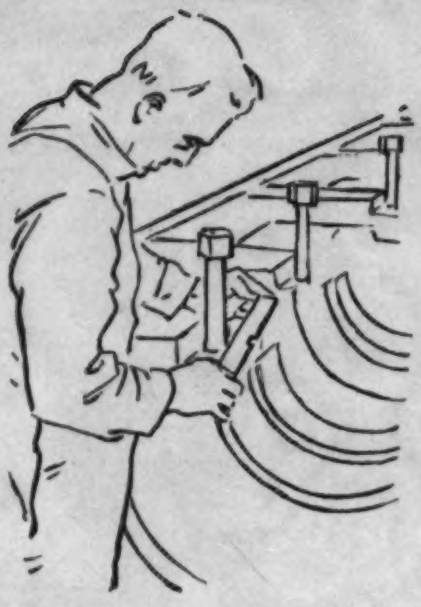

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since the standard test is at 100 degrees Cent. No adequate data are available to serve as a basis for higher temperature specifications so those with suitable facilities are urged to submit aging data on commercial electrical sheet at temperatures above 100 degrees Cent. So far there is little evidence to indicate that maximum aging occurs below this temperature.

Committee B-3 on Corrosion of Nonferrous Metals and Alloys developed the new method of total immersion testing of nonferrous metals (B185-43T) which gives minimum requirements for making total immersion test permitting a wide latitude in choice of test conditions to cover specific uses of the test.

A method of alternate immersion testing of nonferrous metals is expected to be published as a tentative standard.

Committee B-8 on Electro Deposited Metallic Coatings reported publication of "Recommended Practice for Chromium Plating on Steel for Engineering Use" B 177-43 T. "Emergency Specifications for Electro Deposited Coatings of Lead on Steel" has also been issued as ES-31.

Approved at the meeting was a new "Recommended Practice for Preparation of Low-Carbon Steel for Electroplating" (B 183-43T). Subcommittee III on Conformance Test has conducted a questionnaire on the Salt Spray Test which will appear in STEEL shortly in connection with an abstract of the paper by C. H. Sample "Use and Misuse of the Salt Spray Test as Applied to Electrode Deposited Metallic Finishes".

Based on the work of a joint AFA—ASM—SAE—ASTM group committee E-8 on Nomenclature recommended adoption of the "Tentative Definitions of Terms Relating to Heat Treatment of Metals" as a standard. This former tentative standard originally designated E-44-42 T, has now been revised and republished. These definitions replace the former ASTM standard A 119-33.

Through the activities of Committee E-4 on Metallography and the Joint Committee on Chemical Analysis by X-Ray Diffraction Methods, a 4000-card index of X-ray diffraction data, for use with the Hanawalt method of chemical analysis by X-ray diffraction (E 43-42 T), has been issued by ASTM.

Improved Tracing Cloth Resistant to Moisture

A new improved white pencil tracing cloth, "Whitex," developed by the Frederick Post Co., Chicago, is claimed to be moisture resistant on both sides. This feature plus a glass-like transparency is said to assure etching-sharp prints with a uniform background and sharp white detail.

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This new booklet describes the facilities available at Ace for the machining, assembling and heat treating of small parts. A copy will be gladly sent upon request.

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Burn Your Coal

(*Continued from Page* 104)

perature of 150 degrees Fahr. it will not recede from that temperature but will progress to spontaneous ignition within 72 hours.

At the National Power show in New York, the Coal Specialties Co., manufacturers of the hot spot indicators, and the Liquid Carbonic Corp., producers of carbon dioxide, introduced a new method of protecting coal piles. This amounts to guarding the coal pile with hot spot indicators, and reducing heated areas and extinguishing combustion by the use of dry ice. Once the danger area has been discovered by the hot spot indicators, the problem becomes one of eliminating the danger of fire.

Applying Hot Spot Indicators: The number of hot spot indicators required to safeguard a specific tonnage of soft coal varies with the height of the piling as well as with its length and depth. Shallow areas need no protection. Every indicator contains seven fuses, each with a maximum effective radius of 10 feet, including the 10 feet down from the bottom fuse.

Where coal is stored in conical piles or sloping windrows, the indicators may be positioned obliquely and fewer will be needed than where storage is uniform in depth. Where a given amount of coal is stored at comparatively uniform levels, the deeper the storage, the fewer the number of indicators that will be required.

Suppose your storage facilities are limited to an area about 50 feet square, with coal piled to uniform depth. Nine indicators, spaced on 20-foot centers in a smaller 40-foot square—three rows of three indicators with a 10-foot margin—will afford adequate protection, regardless of depth.

If your coal is piled at a uniform depth of 16 feet, these nine indicators will protect 1000 tons or about 20 carloads. But if the coal is piled to a depth of 25 feet, these same nine indicators will safeguard 1562 tons, or more than 30 carloads. By intelligent spacing, each indicator can thus be made to protect from 100 to 200 or more tons of soft coal. And since hot spot indicators are made from restricted materials, it is important to order no more of them than are necessary to satisfy current needs.

Simple Dry Ice Treatment: With the use of dry ice, cooling hot spots and combatting spontaneous combustion fires is simple, inexpensive and extremely effective. The coal pile is first sealed to a height of several feet with wood, building paper, tar or any other satisfactory method of eliminating bottom draft.

It is suggested that 3-inch pipes, equipped with a screw cap at one end and the other end cut and welded to a point, be used to introduce the dry ice into the coal pile. These pipes are easily made. The pointed end can be faced with Stellite for hardness, if desired. A series of ⅜-inch holes are drilled into the pipe about 6 inches back of the point and another set of holes drilled about 1 foot above the first set. Pipes should be about 15 feet in length since coal pile fires rarely occur at depths greater than 10 to 12 feet.

Pipes are sunk into the coal pile in a pattern around the hot spot. Insert 50 pounds of crushed dry ice into each pipe to start with and replace the screw cap, sealing tightly. Carbon dioxide gas, released in the evaporation of the dry ice, makes its way out through the holes in the pipe and through the surrounding coal to effectively smother any flame. At the same time, the refrigerating qualities of the dry ice serve to cool off the "hot spot". Add crushed dry ice into the pipe as needed until the "hot spot" is cooled.

Treating Spontaneous Combustion Fires: Where actual combustion exists, the same treatment is followed with dry ice introduced into the pipes at regular and frequent intervals until the fire is smothered by the accumulation of inert

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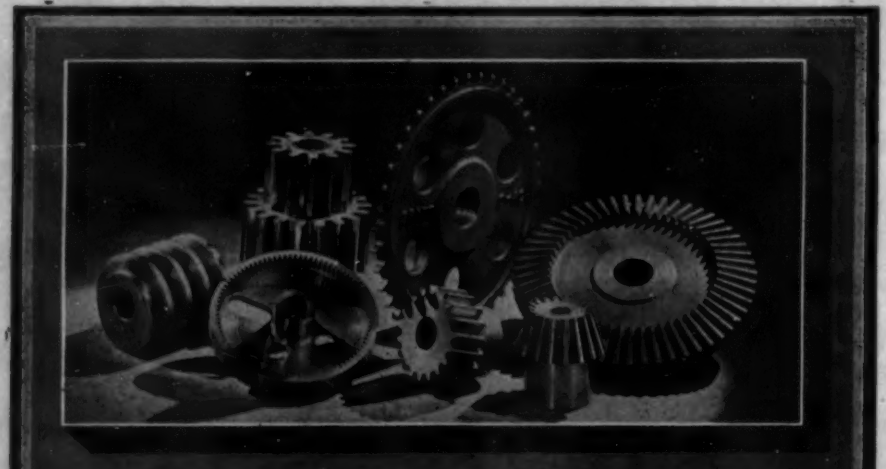

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carbon dioxide gas given off in the evaporation of the dry ice.

The advantage of using dry ice is that it is a two-pronged weapon; the refrigeration it provides cools off the hot spots; the carbon dioxide gas smothers combustion. Its action is simple, direct and inexpensive. The savings it accomplishes in labor, time and unnecessary expense are important, too.

Since a cubic foot of dry ice will expand to approximately 750 times its volume in carbon dioxide gas at ordinary temperatures, 100 pounds of dry ice, when utilized as described above, will more than fill the voids or interstices of one 50-ton carload of soft coal. This quantity of coal is invariably much less in volume than any danger zone when detected at the critical temperature of 150 degrees Fahr.

The manufacture and distribution of solid carbon dioxide, commonly known as dry ice, has become so nation-wide that almost every point in the country is within a few hours service from a source of supply. The cost of dry ice has decreased to a nominal figure and at most points, the average cost would be 3 cents per pound. This treatment eliminates the lost time, the unnecessary labor and the considerable expense which has hitherto been part of the problem of eliminating danger areas or getting at areas of actual combustion. In the past, this has required a great deal of labor in digging or bulldozing the coal to get at the critical zone and has meant considerable expense and loss of time.

The reason why treatment with dry ice is so effective is obvious when it is realized that the *carbon dioxide gas leaves the block of dry ice at a temperature of approximately* 112 *degrees below freezing.* In these days, when there is an expanding shortage of materials, manpower and equipment, the development of hot spot indicators to locate spontaneous heating in coal piles combined with the use of dry ice to cool the "hot spot" or to smother the fires, appears to be an important means of safeguarding plants and personnel against the hazards of spontaneous combustion.

New Issue of Plating and Finishing Guide Offered

The 1943 "Plating and Finishing Guidebook"—the twelfth edition—is announced by Metal Industry Publishing Co. Inc., 11 West Forty-second street, New York.

A 118-page publication, it contains discussions on bright dipping and pickling, plating solutions, stripping metallic coatings, purification of plating solutions, surface treatments, plating specifications, analysis and testing, plating tank wiring, power equipment and organic finishing.

Hobart Launches Welding "Idea Stimulator" Service

A new data service in loose leaf form entitled "Practical Design for Arc Welding" is being released by Hobart Brothers Co., Troy, O. It is a design and suggestion service, replete with time saving suggestions for economical design of change-overs or new products, it is reported.

In order to stimulate the staff of every company as they attack reconstruction problems, Hobart engaged Mr. Robert E. Kinkead, a widely known independent welding consultant, to prepare a series of design suggestions based on his actual experience in many industries. Mr. Kinkead is backed by many years of practical experience and field contact with welding in its various phases and applications.

Suggestions of Wide Application

A loose-leaf format, to fit standard files or binders, is being used to adapt the service to the individual user's preference. These new sheets, from time to time, will offer suggestions that will be of such universal application that the matter of size and detailed specifications are left open—to be determined by the designer in each case, to meet requirements of the purpose at hand.

Designers find it is often helpful in getting started on a job to see what other designers accomplished with welded design, even though the other's work may have been done in an entirely different line of equipment according to the company.

The series is fully intended to fill that need.

Quoting from the introduction by Mr. Kinkead: "This series of sketches deals with arc welding with no thought of disparaging the advantages of other processes of welding. If these sketches suggest more or better ideas to the designer with a problem before him, their purpose will have been served."

Hobart reports the first section of this new service already has been released to a selected list of firms and individual executives.

Other persons interested in the service can be enrolled automatically to receive future plate titles as they are issued by contacting the company.

Sixty plates, each a different design problem, are in process and, the company states, over one hundred more designs are on the way. As the service grows, however, it may be necessary to make a nominal charge to cover part of the expense involved in making the design plates, although the first series is being released at no charge.

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Ransome WELDING POSITIONERS

INDUSTRIAL DIVISION · RANSOME MACHINERY COMPANY · DUNELLEN, NEW JERSEY

Industry Must Prepare To Shoulder Great Task

(*Continued from Page 87*)

lated purchases of machinery and materials, and the use of their products at various levels of gross national output.

(4) Analyze changing markets. Radical alterations in markets, brought about by the war, cannot be measured by projections of past trends alone but should include studies of regional shifts in population and income, and the redistribution of wealth and income.

(5) Markets for new and improved products should be analyzed.

(6) Analysis of their company's selling and advertising effort aimed at reducing marketing expenses and improvement of marketing efficiency.

(7) Studies directed at cutting operating costs and improving production methods should also be given attention.

Internal population movements have been vitally affected by the tremendous industrial war expansion. Michigan and California have witnessed the largest population increases. In general, the Pacific, Gulf, South Atlantic and East North Central states have made considerable gains as a result of the war, at the expense of the Mountain, West North Central and Middle Atlantic states.

Rural Population Declines Sharply

Despite the constant heavy drain to the armed forces, worker-migration to war production centers in the 1940-43 period has increased the civilian population of metropolitan areas by 2,400,000, Arno H. Johnson, director of media and research, J. Walter Thompson Co., New York, stated recently. At the same time civilian population of rural areas and of smaller cities has been lowered by 5,600,000.

The Thompson report showed Mobile, Ala., population increased 57.9 per cent; Norfolk, Portsmouth and Newport News area, 50 per cent. Detroit showed a gain of more than 370,000; San Francisco-Oakland, over 236,000. Population increases in other cities included in the report were: Los Angeles, 185,982; Chicago, 95,011; Cincinnati, 47,704 (1942 figures used); Dayton, 55,825; Akron, 26,029; Columbus and Youngstown, O., about 18,500; and Canton, O., 19,167. Declines were noted in New York, Boston and Cleveland.

No one can state with certainty whether these wartime shifts in population are temporary or permanent, but the consensus is that in the Pacific and Gulf coast areas a large proportion of the gains will be retained.

While the initiative in converting from a war to a peace economy must be taken by industry, the government can furnish

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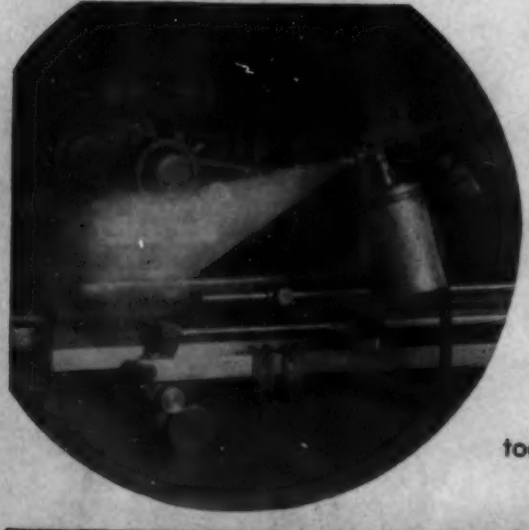

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valuable information on probable peacetime consumption patterns and population shifts. Perhaps it will be desirable to give special assistance to certain inland plants, particularly those in distressed or economically handicapped sections of the country.

Thorough planning and co-operation on the part of the government and private industry will be required in order to bridge the gap between war and peace production so as to accomplish the most efficient disposal of surplus supplies of the armed services; fair and prompt settlement of war contracts; some form of support to small manufacturers in aiding them to acquire needed equipment and materials to get back into civilian goods production; continued efforts to prevent inflation with its consequent maladjustments in the price structure; studies of foreign markets; problem of sustaining investment aimed at encouraging venture capital; utilization of present war plant facilities; and the over-all problem of absorbing the total labor supply into production.

ASU Offers New Help in Placing Brass Mill Orders

A new program to assist aircraft manufacturers in placing brass and copper orders has been established by Aircraft Scheduling Unit, Aircraft Resources Control Office, War Production Board. It will be handled by the nonferrous subunit under Maj. M. C. Durbin, acting for the Aircraft Scheduling Unit. The sub-unit is a part of Lt. Col. A. E. R. Peterka's Materials Distribution Branch, Resources Control Section, Materiel Command, with offices at Steele High building, Dayton, O.

Under present regulations, brass and copper mills will not accept orders from aircraft manufacturers when the mill capacity is filled, even though the order is covered with a CMP allotment number. Normally, the manufacturer would then be forced to check all the remaining mills in an attempt to place his order, thus losing valuable time.

To avoid this, the mills will supply the sub-unit with weekly reports listing their open capacities. Any manufacturer, therefore, who is unable to place his order should immediately contact the sub-unit, giving complete information on the order to be placed.

This may be done by letter, telephone, or wire. It is not necessary to fill out any forms or questionnaires. Upon receipt of the proper information, the subunit will check the list of open capacities and place the order verbally with the mill on behalf of the manufacturer. The manufacturer then will confirm the action with a purchase order.

PRODUCTION STEPPED-UP

200%

by removing heat treating scale with

OAKITE COMPOUND No. 32

Are you looking for an easier, more effective way of removing scale from steel parts after heat treating? If so, the experience of one plant making sub-machine gun parts will interest you.

By immersing hardened steel parts for short period in recommended solution of Oakite Compound No. 32, this concern now gets more thorough, more uniform scale removal results than heretofore. Sand blasting has been eliminated in many instances. Those parts still requiring it are handled faster. Each man does FOUR parts in the same time he used to do ONE. Production has been increased 200%.

Complete Data *FREE!*

Try Oakite Compound No. 32 for removing scale after heat treatment and you, too, will find it does a splendid job . . . provides many advantages from a safety standpoint over commercial raw acids. Write today for further data. No obligation, of course.

OAKITE PRODUCTS, INC.
34E Thames St., New York 6, N. Y.
Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE *Specialized cleaning*

Buy Bonds for Victory

MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

All 3 at the same time!

FIGHT, WIN and PLAN in a practical way for the peace

Mr. Industrial Executive,

Here are excerpts from ten *current* letters addressed to Spriesch in response to advertising that may be helpful to you, in your planning for the peace. (Each is from a genuine letter but for obvious reasons names are omitted.)

HAVERHILL, MASS. . . . "For about a year we have been designing, assembling, and perfecting an automotive device which we plan to manufacture after victory...we expect to have some of the parts made by a concern like yours."

NEW YORK, N. Y. . . . "We are working on plans to develop a postwar program with manufacturers who are seeking distribution of their products in different parts of the country. We would like to know if an arrangement can be developed along these lines."

MONTREAL, CANADA . . . "We are exploring postwar avenues in connection with possible suppliers of parts for a product we have in mind."

LONG ISLAND, N. Y. . . . "You are to be complimented on the attractive format as well as the ideas expressed in your brochure, and in getting it before potential customers... When you can be of service to us, we shall be glad to get in touch with you."

TORONTO, CANADA . . . "We are very much interested in your advertisement, particularly as it may be applied to extruding machinery used in the production of steel alloy welding electrodes."

TORONTO, CANADA . . . "We are planning some very definite changes which we want brought about as quickly as possible after the close of hostilities."

HIGH POINT, N. C. . . . "The writer has a patented item which he desires to manufacture when it will be permissible."

CHICAGO, ILL. . . . "I am developing an aircraft heater for a well known concern and it may be that your organization might fit into this project."

STUTTGART, ARK. . . . "We look for a number of developments here that may tax our facilities."

A SECOND LETTER . . . "I will send you a drawing. Please give me an idea of what this part will cost if you were to make it. Also advise if there will be any charge for such an estimate and if so, how much."

...We, at Spriesch are just as busy as anybody. We went on a 24-hour, 7-day basis long before Pearl Harbor, making Bomb-Releasing Mechanisms and other interchangeable parts and assemblies for all types of fighting Navy and Army Aircraft. We have served the Army since 1928.

★ WE OFFER ★
TO RESPONSIBLE PEOPLE

INGENUITY

along with extensive facilities for bettering anything made from metal...large or small Parts...Complete Assemblies...experimental pieces or mass production.

AFTER VICTORY

As designers and manufacturers of Tools, Dies, Special Machines, Aircraft and other Parts as well as Complete Assemblies of all kinds...we hope, soon, to serve responsible individuals and companies...who may want to use part or all of our combined engineering-manufacturing-dies-tools service, with or without initial, periodic or continuous recommendation for production procedure or product improvement...or who may need help on *what* to make After Victory.

Wherever you are located in the world-at-peace, the Spriesch organization is anxious to work with you...ALSO TO HEAR FROM YOU *NOW!*

● *INDUSTRIAL EXECUTIVES are invited to write (on business letterhead, please) for our informative 36-page brochure, titled "Ingenuity." In it is illustrated and described our extensive facilities and our Spirit...to serve you After Victory.*
Joseph J. Cheney, President

ESTABLISHED 1923

Spriesch

TOOL & MANUFACTURING CO., Inc.

22 HOWARD STREET **BUFFALO, N. Y.**

Ad No. 19

Buying Lull Impends As Mill Books Fill

Essential consumers covered well through year. . . New war phase may cause readjustments. . . Heavy consumption will continue. . . Fabricators pinched by spread in deliveries

DEMAND

Slower, as schedules are covered.

PRODUCTION

Steady at 98 per cent.

PRICES

Unchanged at ceilings.

WITH most steelmakers booked through this year and into 1944 it seems probable that the heavy buying of July will not be repeated in August.

Important programs are being formulated for first half but a temporary lull is likely while they are being completed. The sudden turn of events in Italy has injected an element of uncertainty which may retard freezing of plans for the immediate future and possibly result in shifting of schedules already set up.

The general opinion is that the ship and airplane programs will continue without interruption. It is too early for definite changes following the Italian situation and what line they will take is entirely a matter of conjecture. In any event steel consumption will continue at top speed and no lessening of production can be seen.

Principal factor in the expected slower buying of the next few weeks is the extent to which output already is covered and needs of war industries provided for.

• • •

Most plate mills are practically out of the market for the remainder of the year but in contrast structural mills have difficulty getting tonnage for September rolling. Position of fabricators is complicated by this spread in deliveries and they find difficulty in scheduling such work as they are able to book. Bar deliveries are a further problem, as late November is now about the best than can be obtained on current business.

Orders for fabricated steel in June, at 99,418 net tons, were the largest for any month since July, 1942, when they totaled 125,243 tons. In June, 1942, they were 184,516 tons, as shown by statistics of the American Institute of Steel Construction. June shipments were 77,584 tons, a new low, compared with 88,468 tons shipped in May.

Shipbuilding demand for steel, mainly plates, is given further impetus by Maritime Commission placing 115 Liberty ships with a Maine builder and 108 with a Gulf shipyard. Steel for these vessels is now being placed by the builders for delivery as soon as construction can be started. These awards finish the Liberty ship schedule for these two yards. Stemming out from these contracts will be a large number of subcontracts for subassemblies and revisions in schedules of plate mills may be necessary under the present soldup condition, to meet necessities of these fabricators.

Office of Defense Transportation has taken up the matter of additional allotment of steel for freight car building and will meet with the War Production Board early in August to present the situation. The impression is that additional steel will be allowed for this purpose in fourth quarter.

Steel production last week was steady at 98 per cent, various changes in the several districts balancing. Pittsburgh regained another point from difficulties resulting from the coal strike, reaching 99 per cent. Youngstown gained 3 points to 98 per cent, New England 2 points to 97 and Cincinnati 1 point to 86 per cent. Chicago declined 1 point to 98½ per cent because of repairs, Detroit dropped 1 point to 98 per cent and Buffalo 2½ points to 90 per cent. Rates were unchanged at St. Louis, 92; Birmingham, 95; eastern Pennsylvania, 93; Wheeling, 89; Cleveland, 96.

A seasonal drop in merchant pig iron requirements is being experienced by some sellers, requirements of melters having declined for three consecutive months, beginning in June. At the same time other producers find requirements of their customers holding up well. The easing is attributed in part to foundry suspensions for vacations and inventory, which were more numerous this year than last. Less insistent demand for castings tended to increase vacation suspensions.

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Fluorspar production is said to be running 3000 tons per month behind requirements and WPB is urging producers to develop new sources, to add to their output. Of the recent increase of $5 per ton in ceiling price $1.50 was for expense of developing new deposits and if this is not done it will be withdrawn.

Machine tool builders are turning increasingly to production of other war material wherever possible as facilities are released from normal production. Tool buying is slackening and output is less than at the peak, June being the first month this year when the total dollar value fell below the comparable month in 1942. Orders now being placed are scanned carefully and are relatively proof against cancellation. Manpower problems are more acute and employment of women seems the only solution.

Average composite prices of steel and iron products, held steady by Office of Price Administration ceilings, are unchanged from the level of recent months. Finished steel composite is $56.73, semifinished steel $36, steelmaking pig iron $23.05 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	July 31	July 24	July 17	One Month Ago June 1943	Three Months Ago April, 1943	One Year Ago July, 1942	Five Year Ago July, 1938
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$58.00
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	36.60
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	19.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	13.30

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. **Semifinished Steel Composite:**—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. **Steelmaking Pig Iron Composite:**—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. **Steelworks Scrap Composite:**—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	July 31, 1943	June, 1943	April, 1943	July, 1942
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.49	2.49	2.49
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.22	2.22	2.22
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55
Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron	July 31, 1943	June, 1943	April, 1943	July, 1942
Bessemer, del. Pittsburgh	$25.19	$25.19	$25.19	$25.19
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.34	25.39	25.39	25.39
No. 2 fdry., del. Pitts., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.30	24.30	24.30	24.06
No. 2 fdry., del. Phila.	25.84	25.89	25.89	25.89
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.34	31.54	31.54	31.54
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.33	140.65	140.65	140.65
Scrap				
Heavy melting steel, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting, steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke				
Connellsville, furnace, ovens	$6.50	$6.50	$6.40	$6.00
Connellsville, foundry, ovens	7.75	7.75	7.50	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncropped, $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36; Duluth (bil.) $36.
(Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co. $41, Sterling, Ill.; Laciede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40. Detroit, del. $42; Duluth, billets only, $42.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O.

Open Hearth Shell Steel: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section: 3-12 in., $52; 12-18 in., excl., $54.00; 18 in. and over, $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54; del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, Galveston, No. 5—9/32 in., inclusive, per 100 lbs., $2. Do., over 9/32—47/64-in., incl., $2.15.
Worcester add $0.10; Pacific Ports $0.50.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3": Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Mahoning Valley 2.22½c; Detroit, del. 2.25c; Eastern Mich. 2.30c; New York del. 2.49c; Phila. del. 2.47c; Gulf Ports, dock 2.52c; Pac. ports, dock 2.80c. (Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced in its 8-inch mill.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.80c.
(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.55
		(.20-.30 Mo)	0.60
2300	1.70	4340	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.70	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70c; Toledo 2.80c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City. New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.45c; Eastern Mich 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.20c; Eastern Mich. 2.25c; Phila. del. 2.27c; New York del., 2.34c; Pacific ports 2.65c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.67c; Pacific ports 4.05c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific Ports 4.25c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage, base 2.75c; Granite City, base 2.85c; Detroit del. 2.85c; Eastern Mich. 2.90c; Pacific ports 3.40c.

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Detroit del. 3.45c; Eastern Mich. 3.50c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	....
65	7.15c	7.90c	....
58	7.65c	8.40c	....
52	8.45c	9.20c	....
U.S.S., R.C. Grade 10.10c		.....	....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c;.. Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.45c; Eastern Mich. 3.50c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.50 lb. tin, $4.50; 0.75 lb. tin $4.65.

Tin Mill Black Plate, Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.29c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.45c.

(Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill. Central Iron & Steel Co. 2.20c, f.o.b. basing points.)

Floor Plates: Pittsburgh, Chicago, 3.35c; Pacific ports, 4.00c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Wrought Iron Plates: Pittsburgh, 3.80c

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.27c; Phila., del., 2.215c; Pacific ports, 2.75c.

(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.35c at established basing points and 2.50c, Phoenixville, for export.)

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester, $1 for Duluth):

Bright basic, bessemer wire 2.60c
Spring wire 3.20c

Wire Products to the Trade:

Standard and Cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, Duluth $2.55; Pacific ports 3.05c
Annealed fence wire, 100-lb., Pittsburgh, Chicago, Cleveland 3.05c
Galvanized fence wire, 100 lb., Pittsburgh, Chicago, Cleveland 3.40c
Woven fence, 15½ gage and heavier, per base column ..... .67
Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 70; twisted barbless wire, column 70.

Pipe, Tubes

Welded Pipe: Base price in carloads, threaded and coupled, to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

Steel In.	Blk.	Galv.	Iron In.	Blk.	Galv.
⅛	56	33	½	24	3½
¼ & ⅜	59	40½	¾	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

Steel In.	Blk.	Galv.	Iron In.	Blk.	Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.03	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $40.00.

Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.

Supplies: Track bolts, 4.75c; do. heat treated, 5.00c. Tie plates, $43 gross ton, base.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base, per lb.
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	§§18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. ** Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wasters 65%, except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅞ and ⅝ x 6-in. and shorter	63½ off
Do., ⅝ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex.	U.S.S.	S.A.E.
⅝-inch and less	62	64
¾-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅜-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*6.50
Connellsville, foundry	7.50- 8.00
Connellsville prem. fdry.	7.75- 8.10
New River, foundry	8.50- 8.75
Wise county, foundry	7.25- 7.75
Wise county, furnace	6.75- 7.25
By-Product Foundry	
Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	†12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

*Operators of hand-drawn ovens using trucked coal may charge $7.00, effective Feb. 3, 1943. †$12.75 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	No. 2 Foundry	Basic*	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.53	26.03	27.53	27.03
Brooklyn, N. Y., del.	27.50	.....	.....	28.00
Birdsboro, Pa., base	25.00	24.50	26.00	25.50
Birmingham, base	‡20.38	†19.00	.....	.....
Baltimore, del.	25.61	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	24.22	.....	.....	.....
Cincinnati, del.	24.06	22.60	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del.	26.15	.....	.....	.....
Philadelphia, del.	25.46	24.58	.....	.....
St. Louis, del.	24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.10	24.60	25.60	25.10
Muskegon, Mich., del.	27.19	.....	.....	27.19
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.39	24.89	25.89	25.39
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.31	25.81	26.81	26.31
Duluth, base	24.50	24.00	25.00	24.50
St. Paul, del.	26.63	26.13	27.13	26.63
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston, del.	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.44	24.61	.....	25.11
Neville Island, Pa., base	24.00	23.50	24.50	24.00
‡Pittsburgh, del.				
No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	21.50	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	25.90	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.84	25.34	.....	26.34
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	25.94	25.44	25.44	25.94
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese over 1.00%.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton. Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn.	$28.00
Chicago, del.	31.34

(For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn.	$28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn.	33.00

Gray Forge

Neville Island, Pa.	$23.50
Valley, base	23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.74, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $2 per ton, effective May 20, 1943. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick	
Super Quality	
Pa., Mo., Ky.	$64.60
First Quality	
Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00
Second Quality	
Pa., Ill., Md., Mo., Ky.	46.55
Alabama, Georgia	38.00
New Jersey	49.00
Ohio	36.00
Malleable Bung Brick	
All bases	$59.85
Silica Brick	
Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30
Ladle Brick (Pa., O., W. Va., Mo.)	
Dry press	$31.00
Wire cut	29.00
Magnesite	
Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Basic Brick	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net ton, carloads, CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60% $30. (After Aug. 29 base price any grade $30.)

Ferroalloy Prices

Ferromanganese (standard): 78-82% c.l., gross ton, duty paid, eastern, central and western zones, $135; add $6 for packed c.l., $10 for ton, $10.50 less-ton; f.o.b. cars, New Orleans, $1.70 for each 1%, or fraction contained manganese over 82% or under 78%; delivered Pittsburgh, $140.33. Ferromanganese (low and medium carbon): eastern zone, low carbon, bulk, c.l., 23c, 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c, 2000 lb. to c.l., 24.40c; medium, 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36; 16-19%, $35.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, bulk, c.l., 79.50c, 2000 lb. to c.l., 80c; central, 81c and 82.50c; western, 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l., 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—low carbon, eastern, bulk, c.l., max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.-50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65c for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. to c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr.

Briquets: Ferrochrome, containing exactly 2-lb. Cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 to c.l., 8.75c; silicomanganese briquets, containing exactly 2 lb. manganese and ½ lb. silicon, bulk, c.l., 5.80c, 2000 lb. to c.l., 6.30c; ferrosilicon briquets, approximately 5 lb. and containing exactly 2 lb. of silicon, or weighing approximately 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, ferrochrome, .3c for c.l. and .5c for 2000 lb. to c.l.; silicomanganese, add .25c for c.l., and 1c for 2000 lb. to c.l.; ferrosilicon, add .15c for c.l. and .40c for 2000 lb. to c.l.; western, ferrochrome, add .70c for c.l. and 2c for 2000 to c.l., silicomanganese, add .55c for c.l. and 2c for 2000 lb. to c.l., ferrosilicon, add .30c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l 9.05c; 50%, bulk, c.l., 6.65c and 2000 lb. to c.l. 7.85c; central, 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.35c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicon Metal: Min. 97% and max. 1% iron, eastern zone, bulk, c.l., 12.90c, 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 97% and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicomanganese: Max. 1.50 carbon, bulk, c.l., eastern zone, 6.05c, 2000 lb. to c.l., 6.70c; central, add .25c and 1.00c; western, .55c and 2.00c; f.o.b. shipping point, freight allowed; all prices per pound of alloy.

Manganese Metal: 96 to 98% manganese, max. 2% iron, eastern zone, bulk, c.l., 39.60c, 2000 lb. to c.l., 40c; central, 39.85c and 41c; western, 40.15c and 43.05c; 95 to 97% manganese, max. 2.50% iron, eastern, bulk, c.l., 35.60, 2000 c.l., 36c; central, 35.85c and 37c; western, 36.15c and 39.05c; f.o.b. shipping point, freight allowed.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium: ton lots $1.23; less-ton lots $1.25. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon: per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ¼-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 9.50c; ton lots 10.00c, less ton lots, 10.50c.

Boresil: 3 to 4% boron, 40 to 45% Si., 57 lb. cont Bo., f.o.b. Philo, O.

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars 9400 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.144[11]	4.715	7.762[25]	6.062[25]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[15]	4.613[14]	4.103[21]	4.774	....	....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[15]	4.613[14]	4.103[21]	4.774	....	....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[15]	4.872[25]	4.072[21]	4.772	7.566[25]	5.866[25]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[25]	4.052[21]	....	....	....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[25]	4.041[21]	....	....	....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[24]	4.165[21]	....	....	....
Bethlehem, Pa.*	....	3.45[1]	....	....	....	....	....	....	....	....	....	....	....
Claymont, Del.*	....	....	3.45[1]	....	....	....	....	....	....	....	....	....	....
Coatesville, Pa.*	....	....	3.45[1]	....	....	....	....	....	....	....	....	....	....
Buffalo (city)	3.35[1]	3.40[1]	3.63[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.75[15]	4.40[10]	3.75[21]	4.66	7.35[25]	5.65[25]
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.81[1]	4.65[15]	4.30[10]	3.65[21]	4.35	7.35[25]	5.65[25]
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[15]	4.40[24]	3.75[21]	....	7.45[25]	5.75[25]
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[15]	4.30[24]	3.65[21]	....	....	....
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[15]	4.40[24]	3.75[21]	4.45	7.556[25]	5.856[25]
Cleveland (country)	3.25[1]	.	3.30[1]	.	3.25[1]	3.50[1]	3.50[1]	.	4.30[24]	3.65[21]	4.35[21]	..	..
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[15]	4.500[24]	3.800[21]	4.659	7.680[25]	5.980[25]
Omaha (city, delivered)	4.115[1]	4.165[1]	4.165[1]	5.765[1]	3.865[1]	4.215[1]	4.215[1]	5.608[15]	5.443[26]	4.443[21]	....	....	....
Omaha (country, base)	4.015[1]	4.065[1]	4.065[1]	5.665[1]	3.765[1]	4.115[1]	4.115[1]	5.508[15]	.	.	.	.	.
Cincinnati	3.611[1]	3.691[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[15]	4.475[24]	4.011[21]	4.711	6.10	6.20
Youngstown, O.*	....	....	....	....	....	....	....	4.40[13]	....	....	....	....	....
Middletown, O.*	.	.	.	.	3.25[1]	3.50[1]	3.50[1]	4.65[15]	.	.	.	.	.
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[15]	4.20[24]	3.75[21]	4.65	5.75[25]	5.85[25]
Chicago (country)	3.40[1]	3.45[1]	3.45[1]	5.05[1]	3.15[1]	3.50[1]	3.50[1]	4.85[15]	4.10[24]	3.65[21]	4.55	5.75[25]	5.85[25]
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[15]	4.337[24]	3.887[21]	4.787	5.987[25]	6.087[25]
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[15]	4.568[24]	3.98[21]	4.78	6.08[25]	6.18[25]
St. Paul	3.76[2]	3.81[2]	3.81[2]	5.41[2]	3.51[2]	3.86[2]	3.86[2]	5.257[15]	4.46[24]	4.361[21]	5.102	6.09[25]	6.19[25]
St. Louis	3.647[1]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[1]	5.172[15]	4.347[24]	4.031[21]	4.931	6.131[25]	6.231[25]
Memphis, Tenn.	3.90[3]	3.95[3]	3.95[3]	5.71[3]	3.85[3]	4.10[3]	4.10[3]	5.25[13]	4.66[24]	4.31[21]	....	....	....
Birmingham (city)	3.50[3]	3.55[3]	3.55[3]	5.83[3]	3.45[3]	3.70[3]	3.70[3]	4.75[10]	4.78[24]	4.43[21]	....	....	....
Birmingham (country)	3.40[3]	3.45[3]	3.45[3]	5.83[3]	3.35[3]	3.60[3]	3.60[3]	4.75[10]	4.78[24]	4.43[21]	.	....	....
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	3.95[4]	4.20[4]	4.20[4]	5.25[20]	4.95[10]	4.60[21]	5.00	....	....
New Orleans (country)	4.00[4]	3.80[4]	3.80[4]	5.75[4]	3.85[4]	4.10[4]	4.10[4]	5.15[20]	4.95[10]	4.60[21]	....	....	....
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[3]	3.75[3]	4.30[3]	4.30[3]	5.25[13]	5.43[10]	4.50[23]	....	....	....
Los Angeles	4.35[4]	4.60[4]	4.90[4]	7.15[4]	4.95[4]	4.90[4]	6.70[4]	5.95[16]	7.15[6]	5.70[22]	....	9.55[25]	8.55[25]
San Francisco (city)	3.95[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	4.50[7]	6.60[10]	7.55[10]	5.55[22]	....	9.80[9]	8.80[9]
San Francisco (country)	3.85[7]	4.25[7]	4.55[7]	6.25[7]	4.45[7]	4.40[7]	4.40[7]	6.50[10]	7.45[10]	5.45[22]	....	....	....
Tacoma	4.20[8]	4.45[8]	4.75[8]	6.50[8]	4.65[8]	4.25[8]	5.45[8]	5.70[8]	6.63[24]	5.75[22]	....	....	....
Seattle (city)	4.20[8]	4.45[8]	4.75[8]	6.50[8]	4.65[8]	4.35[8]	5.45[8]	5.70[8]	6.63[24]	5.75[22]	....	....	8.00[8]

*Basing point cities, with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed by Office of Price Administration in amendments Nos. 10 to 16 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 3999 pounds; [6]—300 to 1999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base.

Ores

Lake Superior Iron Ore
Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore
Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	13.00

Foreign Ore
Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore
(Equivalent OPA schedules):
Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash. (S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (seller's nearest rail)	
48% 3:1	52.80
less $7 freight allowance	

Manganese Ore
Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars, New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)

Brazilian, 48%	73.8c
Brazilian, 46%	71.8c
Caucasian, 51%	75.3c
Caucasian, 50%	74.8c
Chilean, 48%	73.8c
Indian, 50%	74.8c
Indian, 48%	73.8c
South African, 48%	73.8c
South African, 46%	71.8c
(Duty Free)	
Cuban, 51%	86.5c
Cuban, 48%	85.0c
Cuban, 45%	82.0c
Philippine, 50%	85.0c
Domestic, 48%, f.o.b. mines	100.0c

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Chemical Composition Limits, Per Cent—Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Electric furnace: Bars per 100 lb.	Billets per G T	Bars per 100 lb.	Billets per G T
NE 1330	.28-.33	1.60-1.90	.20-.35	.....	.....	.....	$ .10	$2.00	....	....
NE 8020	.18-.23	1.00-1.30	.20-.35	.....	.....	.10-.20	.45	9.00	$.95	$19.00
NE 8442	.40-.45	1.30-1.60	.20-.35	.....	.....	.30-.40	.90	18.00	1.40	28.00
NE 8613	.12-.17	.70- .90	.20-.35	.40-.60	.40-.70	.15-.25	.75	15.00	1.25	25.00
NE 8720	.13-.18	.70- .90	.20-.35	.40-.60	.40-.70	.20-.30	.80	16.00	1.30	26.00
NE 9255	.50-.60	.75-1.00	1.80-2.20	.....	.....	.....	.40	8.00	....	....
NE 9262	.55-.65	.75-1.00	1.80-2.20	.20-.40	.....	.....	.65	13.00	....	....
NE 9415	.13-.18	.80-1.10	.40-.60	.20-.40	.20-.50	.08-.15	.80	16.00	1.30	26.00
NE 9442	.40-.45	1.00-1.30	.40-.60	.20-.40	.20-.50	.08-.15	.85	17.00	1.35	27.00
NE 9537	.35-.40	1.20-1.50	.40-.60	.40-.60	.40-.70	.15-.25	1.20	24.00	1.70	34.00
NE 9630	.28-.33	1.20-1.50	.40-.60	.40-.60	.....	.....	.80	16.00	1.30	26.00
NE 9642	.40-.45	1.30-1.60	.40-.60	.40-.60	.....	.....	.85	17.00	1.35	27.00

Extras are in addition to a base price of 2.70c. per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

					ELECTRIC FURNACE, ACID OPEN-HEARTH AND FOUNDRY GRADES									
					Low Phos. Grades									
	OPEN HEARTH GRADES*	Mixed Bor., Turn., Machine Turnings	Cast Iron Borings	Shoveling Turnings	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	Heavy Structural, Plate 3 ft. and less	Heavy Structural, Plate 2 ft. and less	Heavy Structural, Plate 1 ft. and less	Foundry Steel 2 ft. and less	Foundry Steel 1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$15.00	$16.00	$17.00	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Bethlehem	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Buffalo	19.25	14.25	15.25	16.25	24.25	21.75	20.75	21.25	21.75	20.75	21.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	14.50	15.50	16.50	24.50	22.00	21.00	21.50	22.00	21.00	21.50	17.50	19.00	20.50
Detroit	17.85	12.85	13.85	14.85	22.85	20.35	19.35	19.85	20.35	19.35	19.85	15.85	17.35	18.85
Toledo	†15.35	12.85	13.85	14.85	....	....	....	....	....	....	....	....	....	....
Chicago	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Kokomo	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Duluth	18.00	13.00	14.00	15.00	23.00	20.50	19.50	20.00	20.50	19.50	20.00	16.00	17.50	19.00
St. Louis	17.50	12.50	13.50	14.50	22.50	20.00	19.00	19.50	20.00	19.00	19.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	12.00	13.00	14.00	22.00	19.50	18.50	19.00	19.50	18.50	19.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	12.50	13.50	21.50	19.00	18.00	18.50	19.00	18.00	18.50	14.50	16.00	17.50
Seattle	14.50	9.50	10.50	11.50	19.50	17.00	16.00	16.50	17.00	16.00	16.50	12.50	14.00	15.50

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	$21.00	$22.00	$23.50	$24.00	$24.25	$24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	15.50	16.50	17.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

*Open Hearth Grades refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. †Toledo open-hearth grades cover only No. 2 busheling.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati includes Newport, Ky. St. Louis basing point includes Granite City, East St. Louis and Madison, Ill. San Francisco includes South San Francisco, Niles and Oakland, Calif. Chicago includes Gary, Ind. Claymont, Del., includes Chester, Pa.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $3.50 less; (material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grades of prepared scrap."

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah, Arkansas, Nebraska, Kansas. Delivered price may exceed by not more than $7 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $7 the nearest basing point price. Colorado is remote for Colorado consumers only.

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 12.25c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 14.25c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.46c; under 2000 0.50c.

Lead: Common 6.35c, corroding or chemical, 6.40c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York State, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester-Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less than 2000 lbs.

Secondary Aluminum: All grades 14.00c per lb. except as follows: Low-grade piston alloy (No. 122 type) 13.50c; No. 12 foundry alloy (No. 2 grade) 13.50c; chemical warfare service ingot (92½% plus) 13.50c; steel deoxidizers in notchbars, granulated or shot, Grade 1 (95-97½%) 13.75c, Grade 2 (92-95%) 13.50c, Grade 3 (90-92%) 13.00c, Grade 4 (85-90%) 12.50c; any other ingot containing over 1% iron, except PM 754 and hardeners, 13.50c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb.; add 1c for special shapes and sizes, including 3-lb. ingot and 12-lb. round ingot; incendiary bomb alloy 23.40c, 50-50 magnesium-aluminum 23.75c, ASTM B80-41T No. 11 25.00c, ASTM B94-40T No. 13 25.00c, all others 23.00c. Prices for 100 lbs. or more; for 25-100 lbs. add 10c; for less than 25 lbs. 20c; incendiary bomb alloy f.o.b. plant any quantity; carload freight rate allowed all others for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.75-99.79% incl. 51.62½c; Grade C, Cornish refined 51.62½c; Grade D, 99.0-99.74% incl. 51.12½c; Grade E, below 99%, 51.00c.

Antimony: American, bulk, carlots, f.o.b. Laredo, Tex., 99.0-99.8% grade 14.50c, 99.8% and over (arsenic 0.05% max.; no other impurity to exceed 0.1% 15.00c. Add ¼c for less-carlots to 10,000 lbs.; ½c for 9999-224 lbs.; 2c for 223 lbs. and less.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz. $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $15 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $2.11 lb.; 100 lbs. or more on contract, $1.50 lb.

Indium: 99.5%, $10 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 44.75c per ounce.

Platinum: $36 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.45c; commercial bronze, 90% 21.07c, 95% 21.29c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A, B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 28.75c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c, Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Bare, soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlots 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat, mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameters 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.50c Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2% 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu; 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c, f.o.b. Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¾c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze 90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil., 5%	9.250	9.000	4.625
Phos. br., A. B. 5%	11.00	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	8.000	7.500

Other than Brass Mill Scrap: prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbitt-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 8.00c; Muntz metal condenser tubes 7.50c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more, plant scrap only. Segregated solids: 5-type alloys (2S, 3S, 17S, 18S, 24S, 32S, 52S) 9.00c, 10.00c, 10.50c; All other high grade alloys 8.50c, 9.50c, 10.00c; low grade alloys 8.00c, 9.00c, 9.50c. Segregated borings and turnings: Wrought alloys (17S, 18S, 32S, 52S) 7.50c, 8.50c, 9.00c; all other high grade alloys 7.00c, 8.00c, 8.50c; low grade alloys 6.50c, 7.50c, 8.00c. Mixed plant scrap, all solids, 7.50c, 8.50c, 9.00c; borings and turnings 5.50c, 6.50c, 7.00c.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings, old zinc 7.25c f.ob. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.25c; add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 150

So much sheet tonnage is channeled into large-volume, long-range programs each month little capacity is open to miscellaneous consumers whose requirements fluctuate with smaller war needs. To these, deliveries are lengthening. After warehouse load directives, drums, landing field mats, blitz cans, ship, tin plate and other heavy consuming fabricators are covered, tonnage available is limited and this accounts for much of the tightness in sheets, although demand for miscellaneous needs is not over large in some areas, as in New England.

For drums more 16-gage material is required at the expense of 18-gage stock, although the overall tonnage is maintained. Five-gallon cans for army and air force are taking close to 17,000 tons of 20 and 22-gage cold-rolled sheets per month. One large producer is into January on hot-rolled sheets and December on cold-rolled, except to jobbers who may get tonnage in November. Increased tonnages of galvanized to jobbers has tightened that grade for other consumers and has pushed some third quarter tonnage into the fourth. Some directives are also appearing for sheets.

Narrow cold strip bookings have eased slightly, pending allotment of the balance of steel for fourth quarter delivery. While the volume is not large, late buyers will find some regular suppliers filled on wanted finishes and probably will have to shop around to place the tonnage. Producers in the midwest are not apparently sold up as solid as most eastern mills. Cartridge belt links and clips continue to take large tonnages and 2000 tons for mine fuzes are needed. Fabricators recently asked August delivery, but a directive would be required for shipment this quarter unless mill schedules are revised. Few deferments on deliveries have resulted on inventory checks. Annealing continues a production bottleneck. A detail of note growing out of war demand is the annealing and deep drawing of cold strip with lower carbon content than was the usual peacetime practice.

New York sheet sellers are experiencing a continued brisk demand. Last month business ran well ahead of June and at the moment there are no signs of easing, except in galvanized sheet demand. In this grade, jobbers bought substantially in July under directives granted by the War Production Board, and thus, having covered themselves fairly well on their fall tonnage, are expected to become less active for a while.

Fabricators doing a jobbing business are perhaps more active than at any time in months, particularly the larger metalworkers in this field. A number not only have substantial prime contracts of their own, but are in receipt of an increasing volume of work from some of the larger manufacturing companies who are subletting more of their parts business than formerly.

Deliveries continue to tighten in most cases, although one large producer was recently given larger directives on hot-rolled and galvanized sheets, which enabled him to offer some attractive delivery schedules for a few days, rollings in the current quarter. In general, producers have little hot-rolled tonnage available for delivery before December, and the situation is almost as tight in cold-rolled sheets. Some producers have little to offer in either grade for the remainder of this year.

Orders for light gage hot-rolled sheets for 1944 delivery are appearing, following announcement that schedules are nearly filled for the remainder of this year. Sheetmakers in the Cincinnati district have little to offer for third and fourth quarter and are taking some business for first quarter.

A heavy landing mat program is said to be under consideration for first half, following the cutback in this year's requirements several weeks ago.

Bars . . .

Bar Prices, Page 150

Demand for cold hexagon bars in nut sizes is so great some mills are filled well into first quarter and are avoiding additional tonnage when possible. More hot and cold-drawn carbon bookings are for January delivery, although December is possible on some sizes. Quality grades in small sizes are tightening steadily.

In New England consumption of bars, notably alloys, has been maintained to the point few suspensions or cancellations developed under the share-the-steel program. The September alloy melt schedule is now being scanned by WPB; most alloy tonnage currently taken is for December-January.

Alloy requirements for bolt and nut specialties are up slightly. One large producer has an easier schedule on alloy than carbon bars, notably cold-rolled. Due to large expansions in electric furnace capacity that grade is also easier than open hearth with the same mill.

Plates . . .

Plate Prices, Page 151

Large volume of sub-contracts for shipbuilding are being placed by a Portland, Me., yard with 152 Liberty ships on order, which completes the schedule for that builder. This presages a substantial increase in plate allotments for fabricating shops in New England before the end of the quarter. Some plate mills are sold into January; forward buying under CMP is pronounced in plates, and to meet demand for tonnage for new subcontracts, revisions in delivery schedules may be necessary. Inventories with shipyards are heavier and in some instances additional storage space has been taken outside yards. Knocked-down oil barges, 120 feet long, and taking close to 100 tons each, mainly plates, are widely distributed; more than 1000 have already been placed under contract, largely under the aid to small plants program.

Wire . . .

Wire Prices, Page 151

Delivery on some wire tonnage has been moved forward as a result of deferments placed on shipments to consumers with top-heavy inventories. Large stocks are not confined to any one type, but include many finishes and products; some users will not get much tonnage for six months. A broader distribution is developing and some consumers, unable to get material freely, are slated for more volume. Demand for wire rope continues heavy; capacity is sold through the remainder of the year with movement of wire to rope mills heavy. Allocations to electrode shops are maintained while requirements of valve spring wire are unabated; engine builders are large consumers. Bullet core steel production holds at a high rate. Buying by screw manufacturers is also heavy, both rods and finished wire. Bright wire is available in four to six weeks and rails are slightly easier.

Rails, Cars . . .

Track Material Prices, Page 151

Sellers of car steel are awaiting the outcome of conferences scheduled for early August between representatives of the Office of Defense Transportation and the War Production Board with respect to the release of some steel in fourth quarter for construction of freight cars for domestic lines. The belief is there will be some loosening in the supply.

International & Great Northern railroad has been authorized by federal court at St. Louis to buy 4500 tons of 112-pound rails.

Structural Shapes . . .

Structural Shape Prices, Page 151

Between structural work for United States engineers and subcontracting on ship subassemblies larger fabricators find their position much better than a few weeks ago. Delivery schedules from shops are being extended in many cases, indicating that volume of work is increasing.

A feature of this work is the shift from the usual heavy structural sections to plates and light sections. Considerable sheet work is also included in much of the ship work.

Orders for fabricated steel booked during June totaled 99,418 net tons, compared with 30,327 tons in May and 184,516 tons in June, 1942, the American Institute of Steel Construction reports. Shipments in June declined to 77,584 tons from 88,468 tons in May. In June, 1942, shipments were 182,699 tons. Tonnage available June 30 for future fabrication was 290,250 tons.

Pig Iron . . .

Pig Iron Prices, Page 152

With most heavier peace-time melters of pig iron curtailed by restrictions on output of their products, demand in New England has leveled off at the recent lower rate for August shipments. Higher foundry costs are piled on consumers of iron from the Everett furnace, now priced at $2 above the base; melters are absorbing this, operating under ceilings for their castings. With one or two exceptions, foundries producing for the machine tool industry, are operating on lower schedules; jobbing shops in some cases also need volume. Decline in demand has centered entirely in gray iron shops; malleable and basic requirements are maintained each month. The recent flurry in buying of cast scrap grades is thought to be for stock needs rather than any material improvement in the foundry outlook; should this prove not to be the case, applications for iron for September delivery should be heavier.

Some pig iron sellers, although not all report pig iron allotments for August as being down for the third consecutive month. The trend since May has been generally downward, with a rather appreciable drop in June, a more moderate decline in July (although the melt in July was off more than at first indicated), and a slight drop for August. One large

eastern producer, at least, proves to be an exception as far as the New York district is concerned, as his allocations for August showed a substantial increase, although not one which would bring his tonnage up to the May level.

The further decline for August in various cases is attributed primarily to the fact that the July melt dropped substantially, particularly as a result of suspensions at various foundries during the July 4 holiday week. There were far more of these suspensions this year than last, for vacations and inventory taking. The fact that some companies did not anticipate suspending production at the time they made out their requests for July tonnage, accounts for lighter tonnage in August, in the opinion of some sellers. In other words, these consumers found that they were going to have more iron on hand by the end of July than expected, as a result of their suspensions, and accordingly requested less iron for the following month.

New Committee Discusses Iron Castings Price Order

Organization of a Malleable Iron Castings Industry Advisory committee which is consulting with OPA officials on malleable iron castings pricing matters was announced last week by the Office of Price Administration.

The committee follows: R. R. Fauntleroy, committee chairman, Moline Malleable Iron Co., St. Charles, Ill.; Anthony Haswell, committee vice chairman, Dayton Malleable Iron Co., Dayton, O.; J. H. Redhead, Columbus Malleable Iron Co., Columbus, O.; Ralph N. Cole, Canton Malleable Iron Co., Canton, O.; Charles A. Gutenkunst Jr., Milwaukee Malleable & Gray Iron Works, Milwaukee; W. H. Moriarty, National Malleable & Steel Castings Co., Cleveland; John Wagner, Wagner Malleable Iron Co., Decatur, Ill.; and F. L. Engels, Oriskany Malleable Iron Co., Oriskany, N. Y.

The committee, at its first meeting in Washington discussed with OPA officials a proposed amendment to maximum price regulation No. 241 (Malleable Iron Castings) which would (1) permit malleable iron foundries to recover overtime costs on castings priced on a pre-base period (prior to Oct. 1-15, 1941) basis, and (2) provide a simpler method of adjusting a price when it does not adequately cover costs and operating margin. OPA officials now have these matters under consideration.

Scrap . . .

Scrap Prices, Page 134

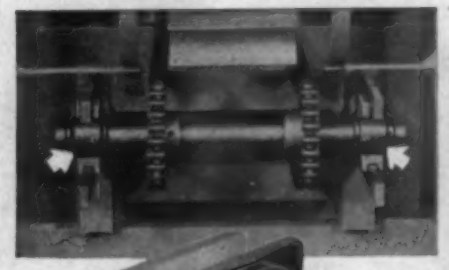
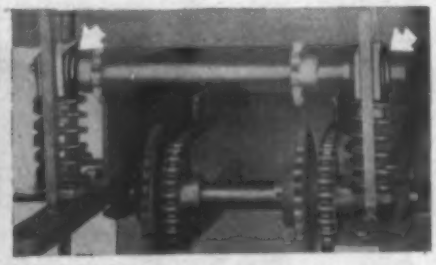
With emphasis on iron ore transportation on the Great Lakes, movement of scrap accumulations from the head of the lakes has been small this season, though stocks ready for shipment are said to be considerable. Buffalo, usually receiving much of this material, has had only three cargoes this year. Receipts at that point by barge from the East have aggregated about 12,000 tons, though little has arrived by this means over the past two weeks.

Dealers in the Buffalo-Rochester area have been directed to ship substantial tonnages to Youngstown, O., and consumers in the former district complain that this diversion affects their ability to build reserves.

In the Chicago district scrap movement is steady and melters are receiving a little more than they consume, volume being well below that of June. The shrinkage is in dealer shipments, industrial supply holding about even. Collections are light and yard processors are not seeking more tonnage than can be handled by their reduced manpower. Material requiring much processing is not sought.

Pessimism rules among scrap dealers and consumers in the St. Louis district and they predict the greatest shortage ever experienced by the middle of September. For several weeks mills have been drawing on inventories and outlook for increased supplies is not bright. Country scrap is in small volume and railroad scrap is not coming out in normal quantities. Industrial material is mainly in borings and turnings, difficult to move and not easily used.

Consumers of open-hearth grades in the northeast area are in a favorable position as to supplies and inventories and considerable plant and shipyard low phos material is going to Pennsylvania by allocation. Demand for cast grades has improved, notably charging-box sizes for steel melting. Supplies reaching dealer yards are light and material from automobile wrecking is dwindling. Labor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shortages and disposal of mixed alloy turnings are major difficulties.

Turnings are in greater supply along the Atlantic seaboard, one consumer recently receiving 47 carloads in one day. Low phos scrap is in ample supply in eastern Pennsylvania. Yard scrap is coming out slowly.

New England Scrap Rates Changed To Aid Disposal

To assist in disposal of scrap located at points in New England distant from baling equipment, minimum weights per car have been lowered, but not less than 15 gross tons. Freight rates on automobile scrap which are not being used are simultaneously cancelled and proportional single line rates established from specific origins in Maine, New Hampshire and Vermont to either Bangor, Me., Burlington, Vt., Lawrence, Mass., Portland, Me., or Springfield, Mass. Rates are on a somewhat higher level, exclusive of any switching charges; such rates apply only on material which, after baling, is reshipped to steel mills in line haul service via the route of the same carrier. Cancelled existing rates on automobile scrap cover origins in Maine, Massachusetts, Vermont and New Hampshire to Boston, Fitchburg, Mass., Manchester, N. H., Portland, Me., and Worcester, Mass.

223 Liberty Ships Placed

Contracts have been awarded by the United States Maritime Commission for 223 Liberty ships, to be built by Gulf and east coast shipyards. The New England Shipbuilding Corp., South Portland, Me., was given a contract for 115 ships and the Houston Shipbuilding Corp., Houston, Tex., a contract for 108 vessels.

These awards are in line with the Commission's emergency shipping program and round out the Liberty ship schedule for these two yards.

Nonferrous Metals . . .

Nonferrous Prices, Page 155

New York—Proposed campaign by the Salvage Division, War Production Board, for the collection of copper and scrap has been postponed due to the heavier volume of material available at present. Dealers, mills and ordnance plants are well loaded with most grades.

Brass rod turnings are being produced faster than this grade can be absorbed while fired cartridge and shell cases are accumulating. An estimated 30,000,000 cartridge cases fired for basic training in this country alone are on hand, to say nothing of a prospective increase in battlefield tonnage.

Much of this material presents a handling, sorting and cleaning problem and fear of contamination in melts retards consumption of fired cases. Although valuable zinc would be lost, suggestion has been made this scrap be routed to refineries.

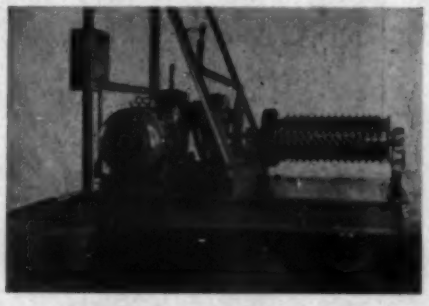
Allocations of new copper have been influenced by the large scrap volume. Allotments for August are slightly smaller because of the scrap situation, but the reserve stockpile will be increased. Foreign arrivals have improved of late.

Reserves of zinc for war essentials gradually increase with high grade easy and prime western tight. High grade zinc is stored at several ordnance plants and more may shortly be allocated users now operating on prime western. The situation between the two grades is reverse that of earlier in the year. Total monthly production of high grade is probably 60 per cent of the whole, or 10 per cent above prime western. While civilian consumption is rigidly controlled, zinc consumers are getting ample metal for essential war requirements. While consumers could have anticipated 25 per cent of August requirements based on July allotments, few did so which would indicate they are not short. As with copper and brass scrap holdings are a growing factor in zinc allotments.

Heavier lead shipments will continue in August. This is due in part to easing of inventory controls during the light transportation months and a substantial tonnage is going into stockpiles. This will have an effect in lower demand in the early fall. Demand for common lead has increased substantially and August allotments include 50 per cent corroding lead, the latter grade taking a premium of $2 a ton.

By a change in copper regulations, all deliveries of brass and wire mill products are banned after September 30, except to fill authorized controlled materials orders. Until such time, a warehouse may fill from stock orders for these products bearing preference ratings of AA-5 or higher, up to 2 per cent of the

Flying High
Designing springs for unusual service is a strong point with RAYMOND engineers. Producing them is in the capable hands of RAYMOND springmakers
RAYMOND SPRINGS
RAYMOND MFG. CO.
DIVISION OF ASSOCIATED SPRING CORP.
CORRY, PENNSYLVANIA



NEW "CAR MOUNTED" PAN PULLER

Travels from furnace to furnace on a narrow gage track, motor propelled. One operator can serve two rows of furnaces! Will show a definite saving over stationary pullers. Easy to handle. Extreme strength and stability. Capacities 2,000 lbs. and higher. Result of over 60 years experience in making this type of equipment.

We also make stationary Pan Pullers to any desired design.

Grabs for Every Need

COMPLETE YOUR CRANES WITH
MANSAVER GRABS

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They can "pass the ammunition" ...faster

Thanks to the Billet Cutting Speed of this "Buffalo" SHEAR

THE knives of this giant shear, with a 3½ million pound cutting power, deliver eight husky chunks of alloy steel billet every minute—and set them on their way to be machined into Victory shells. It's a tough assignment, sure, operating on a 24-hour a day shift—yet the massive construction and simplicity of operation of Buffalo Billet Shears makes easy accurate work of it. Here's just another Buffalo contribution that enables our Fighting Forces to "pass the ammunition *faster*". Engineering details are yours in Bulletin 3295.

ARMY E NAVY

BUFFALO FORGE CO.
158 Mortimer St. Buffalo, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo" BILLET SHEARS

total quantity of products shipped during the period from April 1, 1943 to June 30, 1943.

Canada . . .

Toronto, Ont.—Plates, sheets and bars hold the dominating position but all orders are under direct allocation by the steel controller, and must have his approval before acceptance by mills. On other steel lines mills take direct orders, although rolling schedules are directed by the steel controller. While there has been some easing in supply for the more essential civilian consumers only those who hold top priorities are being favored with deliveries.

Bar demand in practically all finishes is holding at a high level and while orders have fallen below the year's peak there is a steady flow of small lot buying. Mills are heavily booked on bar production, and delivery against new orders is three to four months, unless special request is made by the steel controller.

While inquiries are appearing for sheets, actual order placing is on a conservative scale and most new business is in small lots. There have been no cancellations in the past three weeks. Supply of both black and galvanized sheets continues far below requirements, although releases recently to non-war consumers have been better.

Structural steel lettings were down to about 500 tons for the week, with orders reported in connection with small plant construction work and bridges. While it is stated there are some 3000 tons pending, actual closing dates are indefinite.

Merchant pig iron sales continue slow and supply is said to be slightly in excess of restricted demands. The week's sales totaled about 5000 tons, of which some 3000 tons were malleable iron and 1500 tons foundry, with only minor sales of basic. Pig iron production in Canada has started to climb and is expected to show a new peak for the year during July.

Iron and steel scrap offerings continued slow during the week, and dealers have been drawing heavily on yard stocks to maintain deliveries to steel mills and other consumers. Imports from the United States continue to appear in the Ontario section, but this is being offset by exports from other parts of Canada, so that the balance between Canada and the States is about even.

NO 8 MEXICAN GRAPHITE

for Last Minute Ladle Recarburization

• Tapping time in the open-hearth bay of the foundry or steel plant means concerted action by every hand on the floor. At no time in any industry is there less time for last minute preparations or adjustments—when the huge ladle fills with the liquid steel, any ladle additions made must employ highly dependable materials which work rapidly and efficiently.

If it is desired to add a few additional points of carbon, No. 8 Mexican Graphite tossed into the flowing metal will quickly give a full 80% carbon recovery without the violent reaction obtained from other recarburizers.

No. 8 Mexican Graphite contains no phosphorous, sulphur or harmful impurities and will not dust or produce a flaming action. . . . We should like to assist with the promptness of a trial shipment.

THE UNITED STATES GRAPHITE CO.
SAGINAW, MICHIGAN
U. S. A.

Steel in Europe . . .

London—(*By Radio*)—Steel output is maintained at a high level in Great Britain, with record demand for plates, light sections and special steels. Most of present output of these materials goes into war production and supply is being well maintained against needs of shipbuilding, munitions and aircraft. Coke supply is ample.

STRUCTURAL SHAPES . . .

SHAPE CONTRACTS PENDING

2400 tons, hangar, Goodyear Aircraft Corp., Akron, O.; bids being considered.

REINFORCING BARS . . .

REINFORCING STEEL PLACED

310 tons, propeller test rigs, Wright Field, Dayton, O., for U. S. Army Air Corps, to West Virginia Rail Co., Huntington, W. Va.

175 tons, box culverts, for New Mexico highway department, to Rio Grande Steel Products Co.

150 tons, sewage plant, Wichita, Kans., to Sheffield Steel Corp., Kansas City, Mo.

FINANCIAL

(*Continued from Page 64*)

months and $795,558 recorded in comparable period last year.

American Rolling Mill Reports $3,229,697 Net

American Rolling Mill Co., Middletown, O., reports first half net profit of $3,229,697, equal to 77 cents a common share. Last year the company reported net income of $3,334,323 for the comparable period.

Based on first quarter earnings of $1,535,205, the indicated profit for the June quarter is $1,694,492. In second quarter last year the company earned $1,602,688.

Directors declared a common dividend of 20 cents per share, payable Sept. 15 to record Aug. 16.

Granite City Has Net Of $221,912 in First Half

First half net profit of Granite City Steel Co., Granite City, Ill., totaled

STAMPINGS

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Horizontal drive, made in 35 sizes in ratios of 10 to 1200:1 and from ¾ to 75 horsepower.

D.O.JAMES MOTORIZED SPEED REDUCERS

MOTORIZED HELICAL REDUCER

Horizontal drive—made in 13 sizes in ratios of 1¼ to 9¼:1 and from ¾ to 50 horsepower.

ARMY E NAVY

MOTORIZED WORM GEAR REDUCER

Horizontal drive—made in 11 sizes in ratios of 6 to 80:1 and from ⅛ to 50 horsepower.

SAVE ESSENTIAL AND VALUABLE SPACE

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Downs **CRANE WHEELS**

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DOWNS CRANE & HOIST CO.

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$221,912, equal to 58 cents a share on capital stock. In like 1942 period company earned 254,490, or 66 cents a share.

Based on reported net profit of $121,560 for the initial three months this year, the indicated net for the June period was $100,352 compared with $176,833 in corresponding period a year ago.

Crucible Steel's First Half Net $3,714,069

Crucible Steel Co. of America, New York, reports first half net income of $3,714,069, equal to $6.51 a common share. For like 1942 period company had net profit of $3,846,775, or $6.80 a share.

Second quarter net totaled $1,798,164, compared with $1,915,905 for the initial three months and a revised profit of $2,170,731 in June 1942 quarter.

Sharon Steel Has Second Quarter Net of $489,871

Second quarter net income of Sharon Steel Corp., Sharon, Pa., totaled $489,871, equal to $1.05 a common share. In like 1942 period company earned $386,900, or 79 cents a share, while in the first three months net income totaled $445,564. Based on June quarter earnings indicated first half net profit amounted to $935,436, compared with $637,202 in corresponding period last year.

M. A. Hanna Co. Earns $1,885,327 in First Half

Six months net income of M. A. Hanna Co., Cleveland, totaled $1,885,327, equal to $1.54 a common share. For corresponding 1942 period net profit amounted to $1,834,730, or $1.49 a share.

Company reported June quarter net of $1,031,271, against $1,029,871 in like 1942 quarter.

COMBAT FRICTION MECHANICALLY with HILLS-McCANNA FORCE FEED Lubricators

TYPICAL INSTALLATIONS

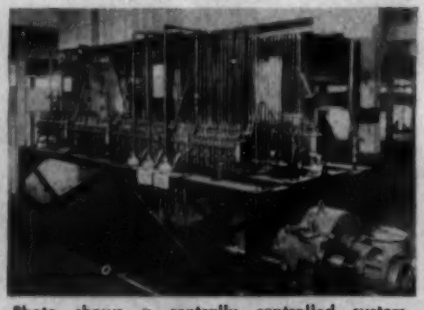
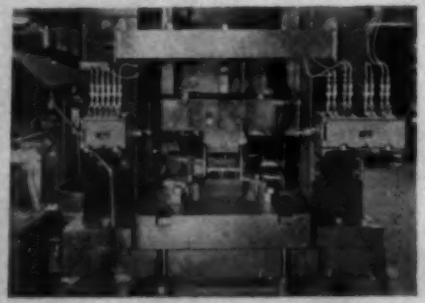


Photo shows a centrally controlled system consisting of 8 multiple feed Hills-McCanna Lubricators feeding oil to scattered machinery throughout a saw mill. Network comprises 112 feeds.



One 8 feed and one 6 feed Hills-McCanna Lubricator supplying oil to bearing and friction surfaces on heavy duty Niagara Punch Press.

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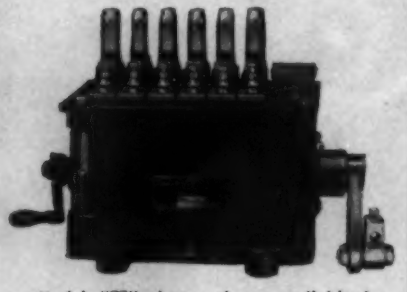
Write us, outlining your requirements. Catalog L-42 on request.



Model "ET" shown above available in 1 to 24 feeds.
Model "MB" available in 1 to 48 feeds.

IT'S HILLS-McCANNA DESIGN . . . WHICH ASSURES HIGHEST EFFICIENCY

Each pump valve on a Hills-McCanna Lubricator is an independent unit enabling positive regulation of each feed without affecting others. The time-proved single plunger Hills-McCanna Pump Valve is the most effective method of forcing oil under pressure to friction points. Oil cannot become trapped or air-bound.

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PROPORTIONING PUMPS • AIR & WATER VALVES • CHEMICAL VALVES
MARINE VALVES • FORCED-FEED LUBRICATORS • DOWMETAL CASTINGS

Keystone Steel & Wire Has Net of $1,092,143

Keystone Steel & Wire Co., Peoria, Ill., reports net profit for fiscal year ended June 30, subject to completion of audit now in process, of $1,092,143, equal to $1.44 a share on 757,632 shares of capital stock. In the preceding fiscal year the company earned $1,796,032 or $2.37 a share on capital stock.

Byers Co. Has Profit of $272,600 in June Quarter

Second quarter net profit of A. M. Byers Co., Pittsburgh totaled $272,600, equal to 66 cents a common share. In the initial three months this year the company earned $350,600, while for the June 1942 quarter earnings amounted to $461,975.

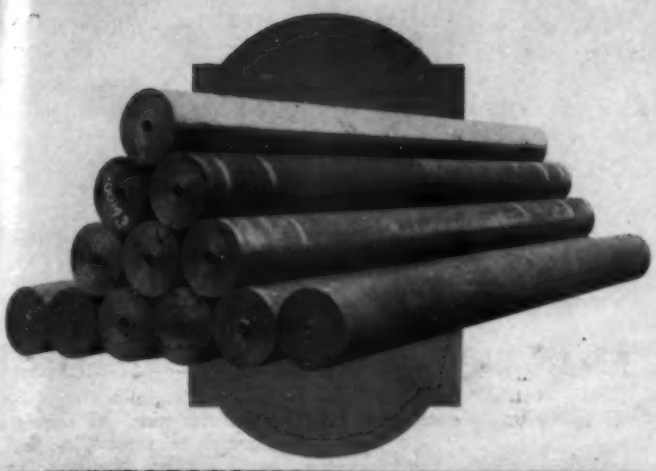
Copperweld Steel Has Six Months Net of $444,141

Copperweld Steel Co., Glassport, Pa., reports first half net income of $444,141, equal to 76 cents a common share. In like 1942 period the company earned $597,868, or $1.06 a share.

Interlake Iron Co. Earns $490,827 in First Half

Net profit of $230,397, equal to 12 cents a share on 1,952,008 shares of capital stock, is reported by Interlake Iron Corp., Chicago, for the second quarter. This compares with $247,840, or 12 cents a share on 2,000,000 shares, for like 1942 period and $260,430 earned in the initial three months this year.

Based on second quarter earnings, profit for the first half amounted to $490,827, compared with $692,602 in like 1942 period.



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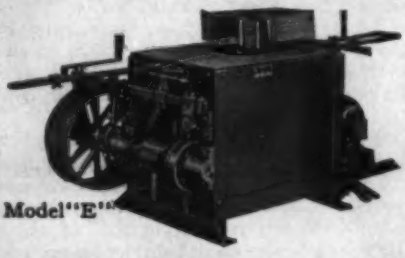
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for Modern Requirements
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Metal Stampings
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304 EIGHTH AVENUE SOUTH
MINNEAPOLIS 15, MINNESOTA

Machine Tool Output Receding; June First To Fall Below 1942

Cancellations continue, but in smaller volume. . . Current orders more stable. . . Deliveries now about four months. . . Tool builders turn facilities to other war production

Cleveland—Downward trend in machine tool production continued throughout June and a further decline occurred during July, reflecting a dearth of new orders and extensive cancellations in recent months. Except for those shops building special tools for the aircraft and shipbuilding industries, machine tool companies anticipate further curtailment in output over the remainder of this year.

Machine tool production during June totaled $108,000,000 compared with $113,710,000 in May. June was the first month since the start of the war program that failed to show an increase over the corresponding month in the preceding year.

Sharp drop in orders booked by machine tool builders making smaller standard tools is shown in the report that June bookings were half the May volume, with the trend continuing downward throughout July in a number of instances. However for the industry as a whole orders are said to be averaging about 50 per cent of shipments.

Order cancellations are estimated at close to 14 per cent of orders, in contrast with a substantially higher percentage earlier this year. All current orders are expected to remain on tool builders' books, for they have been "screened" as to essentiality, and the possibility of locating an idle machine tool to be used as a substitute thoroughly checked.

Machine tool deliveries are estimated to average about four months, with gun boring and smaller standard machines available sooner; while backlogs of gear grinding machines, precision boring, and multi-spindle automatic bar machines are extended up to nine months. On a dollar valuation basis order backlogs June 30 were estimated at $540,000,000, in contrast with a peak of $1.4 billion on same date last year.

Facilities Branch, WPB, Machine Tool Division, has performed a beneficial service in speeding up the war production program through locating idle tools and channeling them into plants where they were urgently needed.

While continued pressure is being put on machine tool builders to clear their backlogs of equipment still on order for vital war work, an equal amount of pressure also is being exerted by government agencies to the end that any idle capacity shall at once be swung over to war work other than machine tools. As a result several well known companies in the field already are in production on aircraft engine parts, navy diesel details, turbine parts, torpedo units, hydraulic control mechanisms, etc.

In the meantime the labor situation becomes increasingly acute, a typical case being that of a company now employing about 5000, this force having been built up from a normal of about 1000, while the armed services were taking 1600 men from the plant. Extensive employment of women thus far has provided the only substantial relief in this particular case.

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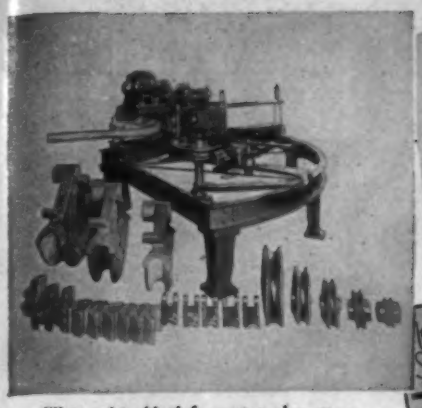
Our Service!
Building good springs, exactly to your specifications, is what we're expected to do. Furthermore it's what we have always done and will continue to do. But we'd like to stress Accurate Service. It's not the ordinary kind of service you would expect from an ordinary source of supply; that isn't good enough —today! The service we mean is the kind that's based on the complete cooperation of everyone here . . . in the office . . . in the plant . . . and in the field; not the "take-it-or-leave-it," "best-we-can-do" kind. It's the kind of service that gets things done—whether helping you work out problems of design or in production.
Accurate service will be helpful to you, if you use springs and wire forms.
Write for our new Handbook of Technical Data on Springs. No obligation.
Accurate Springs
ACCURATE SPRING MANUFACTURING COMPANY
3823 W. Lake Street • Chicago 24, Illinois

Italy Lacks Many Vital Raw Materials

(*Continued from Page* 63)

bearing ores has provided only enough ore for an annual output of pig iron of about 800,000 tons, or about 80 per cent of capacity. Output of iron ore in 1938, including manganiferous, amounted to 1,005,713 metric tons and of pyrites 930,312 tons. To supplement this output, Italy in 1938 imported 385,631 metric tons of ore.

Pig iron production in Italy even back in 1938 was unable to reach capacity for lack of raw materials, totaling at that



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Because: Wing key heat dissipation and absolute diamond lock nib.

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Bucyrus, Ohio

Elliptical rib construction exclusive with Smith

Smith Master Surface Plate and Stand

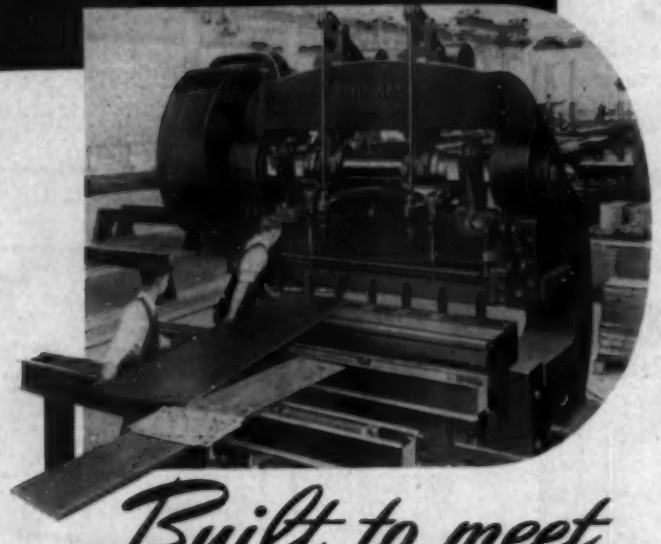
time only 864,500 tons. Crude steel production averaged about 2,150,000 metric tons during the years from 1934 to 1938. Wartime output has been reduced due to a decline in iron and steel scrap imports which in 1938 totaled 632,804 tons.

Italy's steel production is reportedly down to 1,250,000 tons as a result of the disruption of her overseas imports of primary materials and lower output of pig iron. Germany reportedly has found it impossible to supply an adequate amount of basic materials to keep Italian steel plants at capacity production.

Domestic production of manganese ore, which totaled 48,292 tons in 1938, provided about 45 per cent of Italy's domestic requirements. Chrome production is minute and 98 per cent of needs are imported. Italy is also virtually 100 per cent dependent on foreign supplies for such metals as vanadium, tungsten, molybdenum, and titanium. About 80,000 metric tons of the 90,000 tons of copper required by Italy were also imported. Nickel requirements are almost wholly met by imports.

FABRICATING MACHINERY

THOMAS
MILL-TYPE SHEARS



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Write for new bulletin No. 126

THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH, PA.

CONSTRUCTION AND ENTERPRISE

MICHIGAN

CHELSEA, MICH.—Peninsular Furnace & Foundry Co., is rebuilding its burned foundry, at cost of about $50,000.

DETROIT—Engineered Electroplating Service Inc., 1342 East Seven-mile road, has been incorporated with $25,000 capital to conduct an electroplating business, by Lyman B. Sperry, 19318 Whitcomb, Detroit.

DETROIT—J. J. Siefen Co., 5657 Lauderdale, has been incorporated with $100,000 capital to deal in polishing, plating and metal-finishing equipment, by J. J. Siefen, 7700 Middlepointe, Dearborn, Mich.

DETROIT—Detroit Tool & Mfg. Co., 1660 Beard avenue, has let contract to Joseph A. Krausmann Co., 1460 East Jefferson avenue, for an addition to its plant.

REDFORD, MICH.—Detroit Diesel Engine division, General Motors Corp., Detroit, has let contract to National Concrete Fireproofing Co., Citizens building, Cleveland, for a one-story 250 x 250-foot manufacturing building, estimated to cost about $300,000. Argonaut Realty Co., General Motors building, Detroit, is engineer.

ST. CLAIR SHORES, MICH.—St. Clair Shores Machine Products Co., 22201 East Nine-mile road, has been incorporated with $50,000 capital to conduct a general machine shop, by George Holtzbaugh, at above address.

CONNECTICUT

SIMSBURY, CONN.—Frozen Food Lockers, Inc. is having plans drawn by Keith S. Heine, 101 Mohawk drive, Hartford, Conn., for a one-story plant, 50 x 70 feet.

STAMFORD, CONN.—Yale & Towne Mfg. Co., 200 Henry street, will build a one-story addition, 57 x 120 feet.

TORRINGTON, CONN.—A. G. Weigold, Torrington Creamery Inc., West Torrington, represents owners who plan construction of frozen food compartment locker plant with 500 units.

NEW YORK

BUFFALO—Buffalo Foundry & Machine Co. has purchased industrial kettle business of Sowers Mfg. Co. at auction, in which equipment listed at $192,000 was sold piecemeal to dealers.

NEW JERSEY

GARWOOD, N. J.—N. & H. Experimental Tool & Die Works, 11 Cedar street, Cranford, Conn., has plans by C. Bergh, 261 Hickory avenue, for a one-story machine shop building. V. Rizzola, 261 Hickory avenue, is engineer.

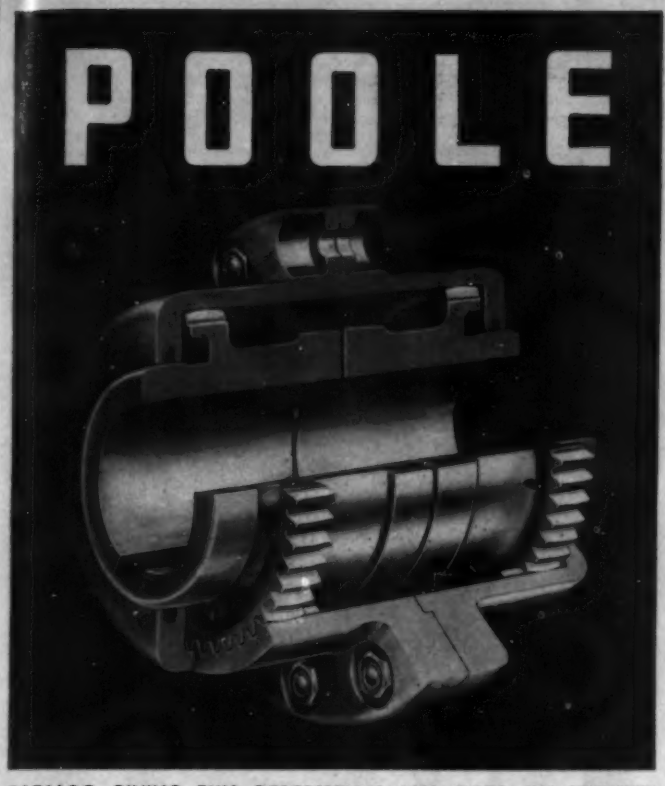
KEARNEY, N. J.—Western Electric Co., 100 Central avenue, has let contract to Hugh Montague & Son, 880 Bergen avenue, Jersey City, N. J., for alterations to a one-story factory building, estimated to cost more than $75,000. (Noted July 19.)

OHIO

CLEVELAND—S. K. Wellman Co., 1376 East Fifty-first street, will occupy a building at 3705 Carnegie avenue, owned by Ostendorf-Morris Co., 925 Guardian building, for light manufacturing machine shop and processing incident to sintered powder metallurgical fabrication.

CLEVELAND—Wright Mfg. Co., 624 Hanna building, has asked permission of board of zoning appeals to use a one-story building

POOLE



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35 x 85 feet at 1621 Prospect avenue, for a machine shop.

PENNSYLVANIA

DONORA, PA.—Donora Steel & Wire Works is modernizing and expanding its plant at cost of more than $40,000.

SCRANTON, PA.—Murray Corp. of America, 7700 Russell street, Detroit, has let contract to Essinger-Misch Co., 159 East Columbia street, Detroit, for additional plant buildings, estimated to cost more than $150,000.

INDIANA

WASHINGTON, IND.—Corcoran Metal Products, West Front street, is rebuilding its burned plant at cost of $100,000, including equipment.

MARYLAND

FAIRFIELD, MD.—Empire Construction Co., 31 South Calvert street, Baltimore, has contract for installing dry dock No. 4 for Maryland Dry Dock Co. J. E. Greiner Co., 1201 St. Paul street, Baltimore, is engineer.

TENNESSEE

EMBREEVILLE, TENN.—Embree Iron Co., W. S. Stringham, president, has obtained site for erection of additional plant capacity.

FLORIDA

JACKSONVILLE, FLA.—City commission has let contract to Combustion Engineering Co., New York, for a 225,000-pound per hour steam boiler for Talleyrand avenue station of the municipal electric plant. Rust Engineering Co., Pittsburgh, has contract for installation, to begin about March 1, 1944. Burns & Roe Inc., 233 Broadway, New York are consulting engineers. Cost estimated at about $700,000.

JACKSONVILLE, FLA.—United States Navy Department, Jacksonville, has let contracts to Wright Construction Co., Columbus, Ga., for five metal-type construction magazines to cost $29,000, at Ft. Lauderdale, Fla.; also five similar magazines at Melbourne, Fla., costing $32,000, and a similar contract at $32,000 for magazines at Vero Beach, Fla. Robert & Co., A. J. Cooper, manager, Naval Air Station, Jacksonville, engineers.

MIAMI, FLA.—Bureau of Yards and Docks, Navy Department, Washington, has let contract to Arkin-Prufert Construction Co. at $26,061, for building facilities for machine gun shop at Naval Air Station, Specification 11381.

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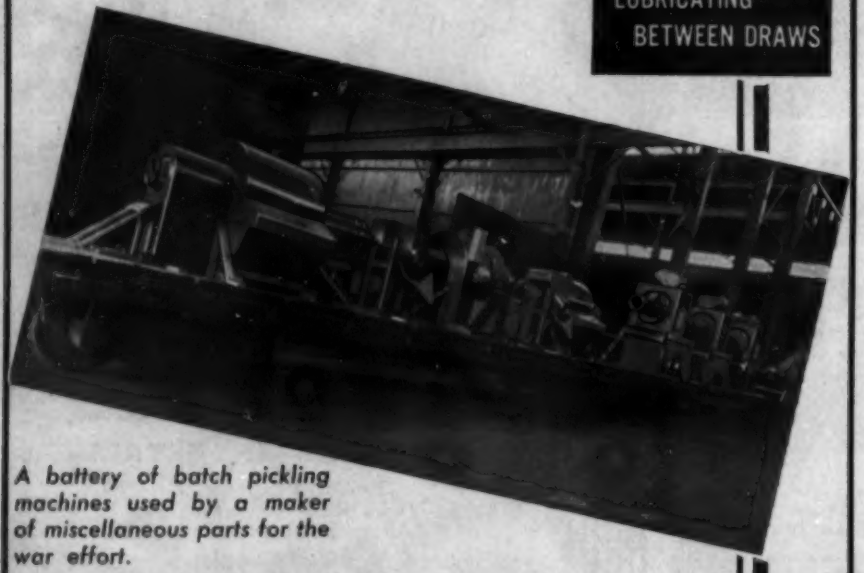

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WEST VIRGINIA

CHARLESTON, W. VA.—Appalachian Electric Power Co., 301 Virginia street, Charleston, is having plans prepared for improvements to the power plant at Cabin Creek, W. Va., Sollitt Construction Co. Inc., South Bend, Ind., having the general contract. Philip Sporn and H. D. Freitag, 30 Church street, New York, are the company's engineers.

OKLAHOMA

TULSA, OKLA.—United States engineer office, Col. F. J. Wilson, district engineer, is calling bids for Fort Gibson dam on Grand river. Includes 17 floodgates and electric power facilities of 45,000 kilowatts, the latter a postwar development.

WISCONSIN

RICHLAND CENTER, WIS.—Richland Hospital has plans by E. A. Steubenbrauch, 708 Erie avenue, Sheboygan, Wis., for a two-story 30 x 48-foot boiler house and laundry building.

TEXAS

HOUSTON, TEX.—John N. Edy, city manager, has plans in preparation for improving water system, including dam and reservoir, main water line and distribution system. Cost estimated at $14,000,000 for next two years and $16,000,000 over several succeeding years. Plan to mature before Jan. 1, 1944. W. W. Horner, Shell building, St. Louis, and Henry E. Elrod City Hall, Houston, are consulting engineers.

MIDLAND, TEX.—Magnolia Pipe Line Co. has filed with the Petroleum Administration, Austin, Tex., application for permission to construct a 12-inch pipeline from Midland to Corsicana, Tex., 394 miles, with three pumping stations.

CALIFORNIA

ALAMEDA, CALIF.—General Engineering & Dry Dock Co., foot of Schiller street, has let contract to Younger Construction Co., Cheda building, San Anselmo, Calif., for a plate shop building.

BURBANK, CALIF.—H. M. Keller Co., 4604 Hollywood boulevard, has contract for a three-story office building at 1705 Victory place, Burbank, for Lockheed Aircraft Corp., 20 x 80 feet, to cost $25,000.

BURBANK, CALIF.—Lockheed Aircraft Corp. has let contract to H. W. Baum Co., 232 South Van Ness avenue, Los Angeles, for a one-story commissary building 150 x 450 feet, including refrigeration system. Parkinson & Parkinson, 433 South Spring street, Los Angeles, are architects. Cost is estimated at $225,000.

CERES, CALIF.—Pacific Dehydrator Co., care Theo. O. Leydecker, plans a six-tunnel dehydrator, to cost over $40,000.

LOS ANGELES—Pacific Steel Treating Co.

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LOS ANGELES—Riteway Precision Co. has been formed by Sam S. Zagel and Arthur Wilens and will establish a plant at 200 East Vernon avenue.

LOS ANGELES—Butane Tank Co. has been organized by R. E. Logue, Samuel J. Coker and Spencer Selby and will establish a plant at 2228 East Washington boulevard.

LOS ANGELES—Columbia Automatic Screw Machine Products Co. has been formed by William J. Buell and Ernest Hazard and will establish a plant at 7401 Sunset boulevard.

LOS ANGELES—Precision Screw Products Co., 5202 Alhambra avenue, has let contract to Steel Bros., 714 Date avenue, Alhambra, Calif., for a new plant 40 x 85 feet, costing $8500, at 4766 Valley Boulevard, Los Angeles.

LOS ANGELES—West Coast Screw Machine Products has been organized by Issac M. Martin and will establish a plant at 6120 South Van Ness avenue.

LOS ANGELES—B. & M. Machine Products has been organized by Fred Boston and William Miller and will establish a plant at 331 West Pico boulevard.

LOS ANGELES—Kain Fixtures & Brass Works has been organized by W. Rankin Stark and will establish a business at 113 Ann street.

RICHMOND, CALIF.—Four large warehouse buildings will be erected for the engineering department of the Richmond Shipbuilding Co. at yard No. 4 by Moore & Robbins, 693 Mission street, San Francisco. They will be 180 x 1500 feet, 200 x 960 feet, 120 x 420 feet and 200 x 420 feet.

SAN FRANCISCO—Matson Navigation Co., 215 Market street, has let contract to Swinerton & Walberg Co., 225 Bush street, for plate and sheet metal shops. Leland S. Rosener, 233 Sansome street, is engineer.

SOUTH PASADENA, CALIF.—Pickens Screw Machine Products has been formed by B. W. Pickens and will establish a plant at 2183 Huntington drive, South Pasadena.

SOUTH PASADENA, CALIF.—Standard Remote Control, 201 Pasadena avenue, will build a one-story factory and office building, to cost about $9000.

VENICE, CALIF.—Airesearch Mfg. Co., 9851 Depulvedia boulevard, will build an additional plant building, 82 x 302 feet, to cost about $45,000.

VENICE, CALIF.—Apex Aircraft Tooling Co. has been formed by Catherine Hostler and will establish business at 371 Rose avenue.

VENTURA, CALIF.— Ventura Mfg. & Implement Co. has been formed by Herman Wechsler and B. E. Kulper and will establish a plant at 1056 East Front street.

WILMINGTON, CALIF.—Western Pipe & Steel Co., shipbuilding division, will build a tinshop 48 x 80 feet and a one-story top addition to its building, 40 x 250 feet.

OREGON

PORTLAND, OREG.—Langville & Peterson Inc., machine tool manufacturers, S. E. Seventeenth avenue and Linn streets, Portland, will build a new shop and office building adjacent to its plant, 97 x 148 feet, to cost about $35,000.

WASHINGTON

PASCO, WASH.—E. I. du Pont de Nemours & Co., 111 West Lewis street, Pasco, G. P. Church, project manager, and W. W. Campbell, chief engineer, plans a chemical plant in Franklin county, to cost more than $100,000,000. A railroad, roads, streets and housing project are included, to be built by various Los Angeles and San Francisco contractors.

VANCOUVER, WASH. — Kaiser Vancouver shipyard has let contract to Wegman & Son, Board of Trade building, Portland, Oreg., for a two-story maintenance building 70 x 180 feet.

CANADA

EDMONTON, ALTA.—Department of Munitions and Supply, Ottawa, R. T. Donald, secretary, has given general contract to Jamieson Construction Co. Ltd., 4777 West Second avenue, Vancouver, B. C., for construction of airport addition here, comprising some 70 buildings at cost of about $2,000,000, and for 18 buildings, including hangars, etc., to cost $4,300,000 at Namao, about seven miles from here. The Namao airport will be used by the United States government.

VANCOUVER, B. C.—North Van Ship Repairs Ltd., 171 Esplanade, North Vancouver, plans construction of plant addition to cost about $40,000.

LONDON, ONT.—Taylor Electric Mfg. Co. Ltd., 625 Princess street, A. Taylor, manager, has given general contract to John Hayman & Sons Co. Ltd., 432 Wellington street, for construction of plant addition to cost about $20,000. Watt & Blackwell, 284 Dundas street, are architects.

NIAGARA FALLS, ONT.—Canadian Carborundum Co. Ltd., Stanley street, plans plant extension to cost about $240,000, with equipment, to include furnace buiding, two transformer buildings, pig breaking building, etc.

NIAGARA FALLS, ONT.—Lionite Abrasives Ltd., P. O. Box 3, plans to start work immediately on construction of plant addition in Stamford township, to cost about $25,000.

ST. CATHARINES, ONT.—Packard Electric Co. Ltd., 13 Race street, has had plans prepared for plant addition and installation of equipment to include 40-ton electric crane, to cost about $15,000.

TORONTO, ONT.—Bakelite Corp. of Canada Ltd., 163 Dufferin street, will let contracts soon for plant addition to cost, with equipment, about $45,000.

WINDSOR, ONT.—Ford Motor Co. of Canada Ltd., Sandwich street East, plans plant alterations and installation of new equipment to cost about $20,000.

DRUMMONDVILLE, QUE.—Canadian Celanese Ltd., is having plans prepared by own staff and plans to start work soon on plant addition to cost about $315,000. The company, in association with Department of Munitions and Supply, Ottawa, is working on plans for construction of plastics and chemicals plant estimated to cost about $5,000,000.

MONTREAL, QUE.—Canadian Car & Foundry Co. Ltd. has given general contract to Foundation Co. of Canada Ltd., 1538 Sherbrooke street West, for construction of extension to Turcot Propeller division, at approximately $45,000.

MONTREAL, QUE.—Carter White Lead Co. of Canada Ltd., 1295 Delorimer avenue, plans plant repairs and addition to cost about $15,000, for which J. S. Hewson, 660 St. Catharine street West, has general contract.

MONTREAL, QUE.—Northern Electric Co. Ltd., 1261 Shearer street, plans building repairs and installation of new equipment to cost about $30,000.

MOUNT LAURIER, QUE.—Lefebvre Freres Ltee, machinists, plans one-story, 20 x 40-foot foundry addition, estimated to cost, with equipment, $15,000.

SHERBROOKE, QUE.—Industrial Stampings Ltd., 184 King street West, plans two-story plant addition, to cost, with equipment, about $40,000.

ST. JOHNS, QUE.—Singer Mfg. Co., St. Paul street, will install new equipment, including lathes, etc., to cost about $25,000.

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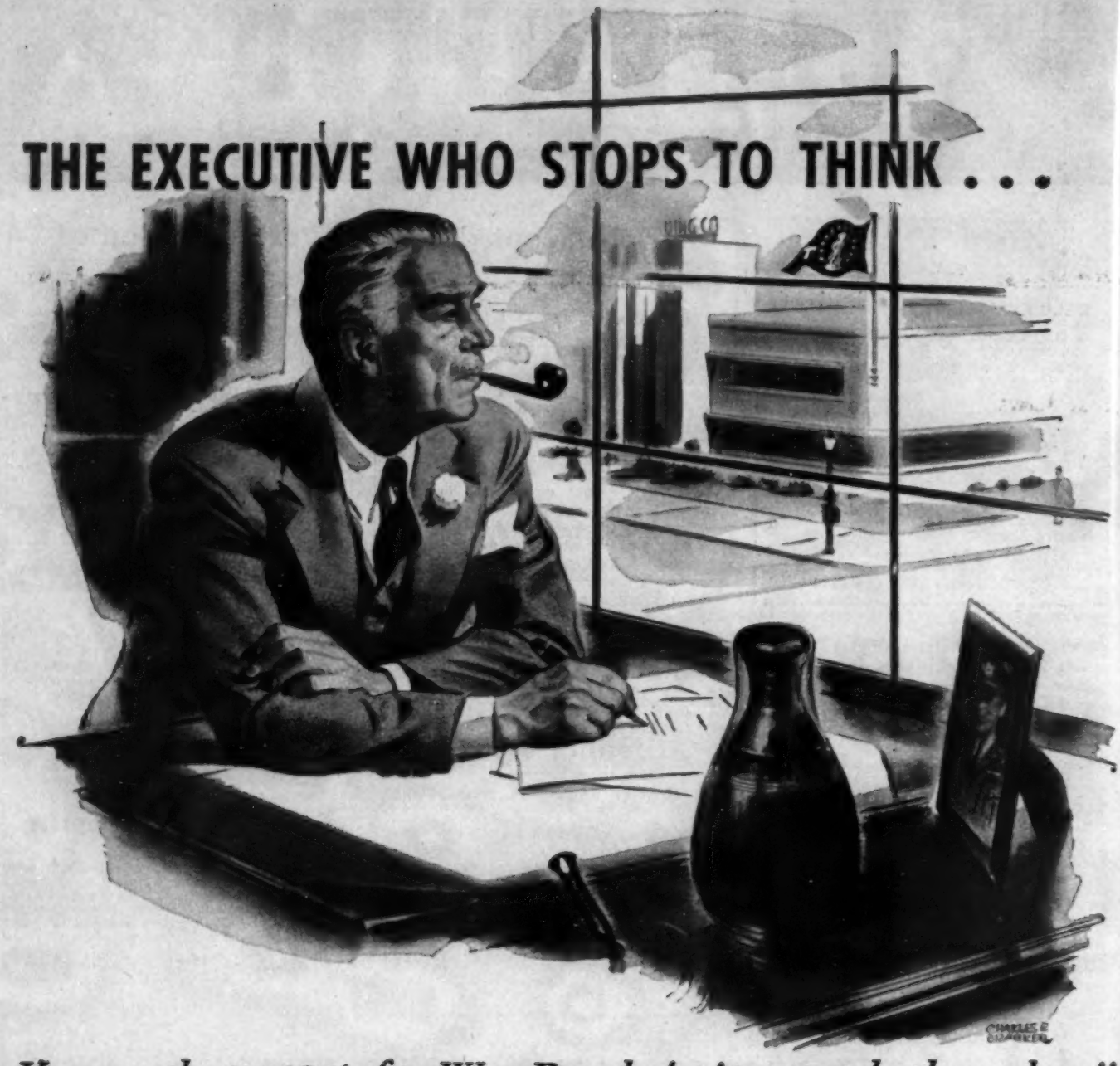

Knows that "10% for War Bonds isn't enough these days"

Workers' Living Costs going up . . . and Income and Victory Tax now deducted at source for thousands of workers . . .

Check! You're perfectly right . . . but all these burdens are more than balanced by *much higher* FAMILY INCOMES *for most of your workers!*

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For details get in touch with your local War Savings Staff which will supply you with all necessary material for the proper presentation of the new plan.

Last year's bonds got us started—*this year's bonds are to win!* So let's all raise our sights, and get going. If we all pull together, we'll put it over with a bang!

This space is a contribution to America's all-out war effort by

STEEL

you've done your bit
. . . now do your best!

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